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NOT TO BE TAKEN AWAY.

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INCLUDING

CEYLON AND BURMA.

Published under the authority of the Secretary of State for India in Council.

EDITED BY W. T. BLANFORD.

HYMENOPTERA.—Vol. II.

ANTS AND CUCKOO-WASPS.

BY

Lieut.-Colonel C. T. BINGHAM.

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ALERE FLAMMAM.

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PREFACE.

This volume is the second by Col. Bingham containing descriptions of Hymenopterous Insects, and includes the Ants, or Formicidæ, and the Chrysididæ. These families complete the Aculeate division of the Order Hymenoptera. The first volume, comprising the Bees and Wasps, was issued in 1897, and the author has devoted much of his time in the intervening years to the collection and study of Ants and other Insects in Burma and India.

A single coloured plate, to illustrate the Chrysididæ, is added. The Ants, which are dull-coloured and generally black or brown, are sufficiently represented by figures in the text.

The Ants of India, Ceylon, and Burma are numerous, and they have received in recent years much attention from naturalists. The Chrysididæ are less well known than the Ants, and it is probable that further additions may be made to the list of species recorded as occurring in British India.

It is not proposed for the present to proceed with the remaining families of Hymenoptera in the 'Fauna of British India.' As, however, a large number of species belonging to the Ichneumonidæ and other families are known, and as all are of considerable interest and importance, it may be hoped that an account of them will be published at some

future time. The knowledge of the Indian members of these groups is more imperfect than is that of the Aculeata. At present Col. Bingham's knowledge of Indian animal life, accumulated during a long period of service in India and Burma, can be employed upon a group of insects that is better known, and of which a complete general account has for many years been urgently required. The Editor has much satisfaction in being able to announce that H.M.'s Secretary of State for India has approved of the inclusion of the Indian Butterflies in the present series, and that Col. Bingham has undertaken the description of them.

Other volumes of the fauna which are nearly ready for the press, and which may be expected before long, are Mr. Gahan's on Longicorn Coleoptera, and a second volume of Rhynchota by Mr. Distant. Land and Freshwater Mollusca and the Butterflies will, it is hoped, appear in due course.

For the first time in many years, less than a twelvemonth has elapsed between the publication of the last part of the Fauna, Vol. I. of the Rhynchota, and its successor, the work now issued.

W. T. BLANFORD.

March 1st, 1903.

INTRODUCTION.

THE tribe *Heterogyna*, suborder ACULEATA of the Hymenoptera, consists of but one family, the *Formicidæ* or Ants.

Morphologically ants are at once distinguished from other aculeate Hymenoptera by a remarkable modification of the one or two segments of the abdomen immediately following the median segment or propodeum. This modification of the anterior portion of the abdomen consists in the almost complete detachment of one or two segments from the rest of the abdomen to form a highly flexible pedicel composed of one or two nodes. In the majority of the genera of the *Formicidæ*, the attachment of the pedicel to the median segment in front and to the rest of the abdomen behind is extremely constricted and narrow, giving great freedom of movement to both thorax and abdomen properly so called. When the pedicel is formed of two segments a similar constriction lies between the two. In certain low forms (*Myopopone*, *Amblyopone*, &c.) the node of the pedicel is attached by the whole of its posterior face to the succeeding segment of the abdomen, showing an approximation to the stiffer and more ponderous form of abdomen possessed by the fossorial wasps of the family *Scoliidæ*.

Ants, like the honey-bees and one section of the wasps, are social insects with, in any well-established nest or community, three distinct forms—the perfect and fertile female (♀), the male (♂), and the so-called neuter or worker (☿), which is merely an undeveloped female. Very often there is more than one form of worker, and in some cases the largest form or forms differ considerably from the smaller in structure; these are known as soldiers (♃).

Unlike the neuters among the bees and wasps, the neuter ants are invariably wingless, and generally have the thorax more or less modified and different from the thorax in the female or male. Exceptional cases, however, occur in certain genera, where the fertile females, or males, or both, are ergatoid, assuming the form of thorax peculiar to the worker.

The parts of the head, thorax and abdomen in an ant are homologous with those in other hymenopterous insects, but are generally modified. The subjoined figures give illustrations of some

of the various forms assumed by these, with details of the parts of which they are composed. The lettering in all the figures is alike and refers to the same parts.

Fig. i.

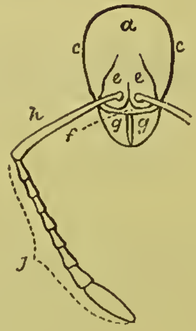


Fig. ii.

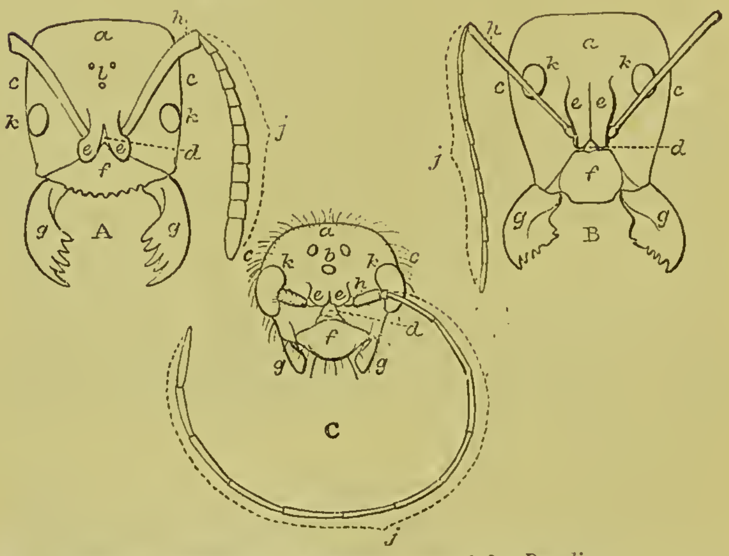
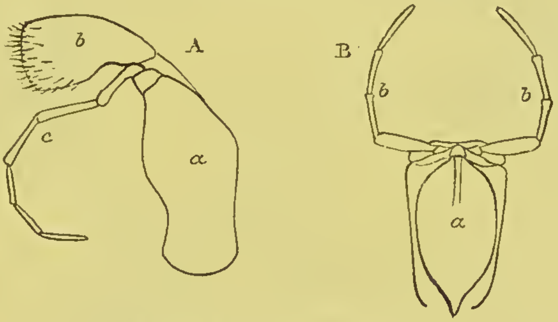


Fig. i.—Head in outline of ☿ of *Ænictus*, one of the *Dorylinæ*.
Fig. ii.—Heads in outline of A ♀ and C ♂ of one of the *Ponerinæ*, B ☿ of one of the *Camponotinæ*.

a, vertex; *b*, ocelli, generally present in the ♀ and ♂, in some cases also in the ☿, but more often absent in the last; *c*, *c*, sides of head, which may be straight or convex; *d*, frontal area, always small, sometimes well-defined, often obsolete or indistinct; *e*, *e*, frontal or antennal carinæ, rarely nearly obsolete or ill-defined, often very prominent: in many of the *Ponerinæ* anteriorly flattened and broad, covering the bases of the antennæ; *f*, clypeus; *g*, *g*, mandibles, both of which organs vary greatly, not only among the different subfamilies and genera but among the different species of the same genus: generally also they are very dissimilar

in the ♂ from what they are in the ♀ or ☿ ; *h*, scape, *j*, flagellum, the two united forming the antenna: the scape or basal joint, except in the ♂ of certain species, is always longer than any of the other joints, these latter are often greatly modified in relative size and thickness, but in the great majority the apical joint of the flagellum is the longest and broadest; *k*, *k*, compound eyes, which may be present or absent, and composed of few (one to five) or many facets. The softer mouth-parts of ants are similar to those of typical Hymenopterous insects fully described at p. iv of the Introduction to Vol. I. of the Hymenoptera in this series. Owing probably to the small, often minute size of the vast majority of ants, the mouth-parts have not been much used in determining the classification. Fig. iii repre-

Fig. iii.



Mouth-parts of *Camponotus* ☿.

sents the maxilla (A) and labium (B) of one of the *Camponotinæ*. In A: *a*, stipes; *b*, galea; *c*, palpus. In B: *a*, ligula; *b*, *b*, palpi.

The *thorax* in ants varies enormously in shape and development of the component parts. The thorax of a ☿, as already stated, differs markedly from the thorax of the ♀ or ♂ of the same species, except in the case of ergatoid males and females. Figs. iv–viii illustrate partially the forms of the thorax in the five subfamilies; but as the genera vary greatly among themselves, no form can be selected as in any way typical, and reference should be made to the illustrations in the body of the text for the peculiar form of thorax assumed by any genus. Taking the *Ponerinæ* for example, fig. iv and fig. v (B & C) represent the thoraces of one of the species in the ♀, ♂ and ☿. The parts are:—*a*, the prothorax, generally forming a portion of the dorsum in the ♀ as in fig. iv, but often suppressed beneath the mesonotum in the ♂, fig. v, B, and also in the ♀, fig. vi; in the ☿, fig. v, C, and figs. vii & viii, it is level with the mesonotum; *b*, the mesothorax with its scutellum *c*, the latter often nearly or quite suppressed and rudimentary; *o*, the postscutellum or upper portion of the metathorax is often (nearly always in the ☿) completely obsolete, but *d*, properly the median segment, has, according to usual

custom, been termed the metanotum or metathorax throughout the descriptions in this book. The lateral visible parts of the

Fig. iv.

Fig. vi.

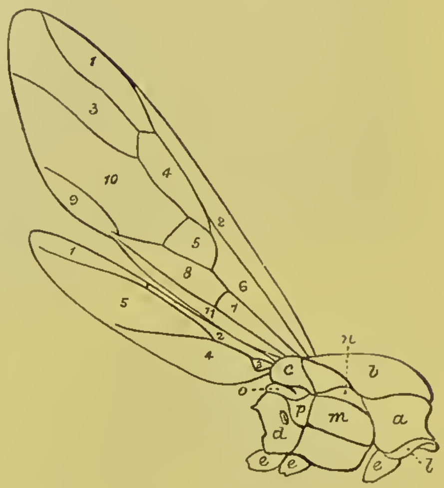


Fig. v.

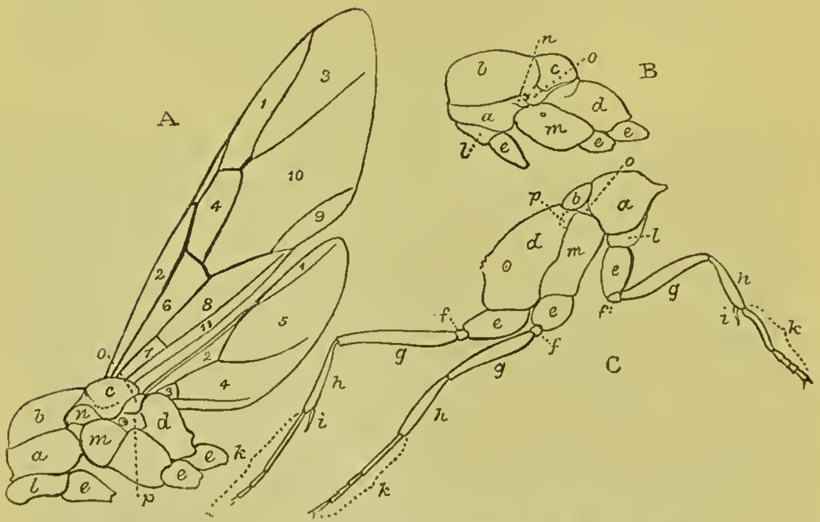
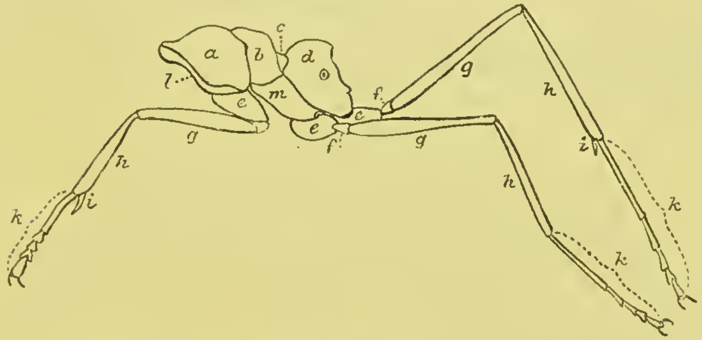


Fig. iv.—Details,—thorax and wings of ♀ of the *Ponerinæ*.
,, v.—A. Details,—thorax and wings of ♀ of the *Camponotinæ*.
B. Details,—thorax of ♂ of the *Ponerinæ*.
C. Details,—thorax of ☿ of the *Ponerinæ*.
,, vi.—Details,—thorax and wings of ♀ of the *Myrmecinæ*.

thorax are *l*, the propleuræ; *m*, the mesopleuræ, often with a more or less indistinct suture dividing or partially dividing the

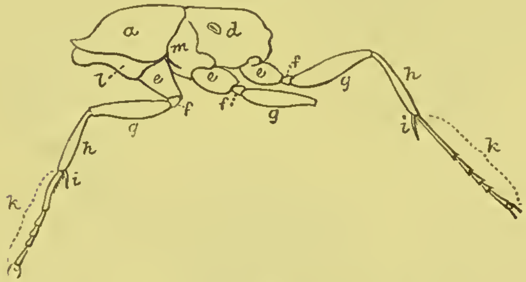
episternum from the epimeron; *p*, a portion of the almost suppressed and obsolete metapleuræ. To the mesothorax at the sides above are attached in the ♀ and ♂ (ergatoid forms excepted) the fore wings, and to the sides of the metathorax the hind wings; the neuration of the wings is less complete than in most of the

Fig. vii.



Details,—thorax and legs of ☿ of the *Dolichoderinæ*.

Fig. viii.



Details,—thorax and legs of ☿ of the *Dorylinæ*.

Aculeata. In the fore wing:—*1*, radial; *2*, costal; *6*, medial; and *7* & *8*, two submedial cells, are always complete; the others are variable and may or may not be present, complete or incomplete. Three pairs of legs are present in all the sexes, the parts of which as shown are *e*, *e*, coxæ; *f*, *f*, trochanters, single-jointed; *g*, *g*, femora; *h*, *h*, tibiæ; *i*, *i*, tibial calcaria, which may or may not be present on all the legs, are often double, and may be pectinate or simple; *h*, *h*, tarsi with 5 joints, the apical joint armed with two claws, which may be pectinate, dentate, or simple.

The *abdomen* in the ♀ and ☿ is composed of 6, in the ♂ of 7 visible segments, and is, like the rest of the parts in ants, very variable, generally more massive and comparatively longer in the ♀, smaller and more slender in the ♂ than in the ☿. Figs. ix–xiii show some of the forms obtaining in the various subfamilies; the

Fig. ix.

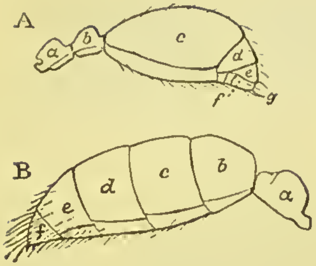


Fig. x.

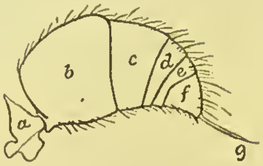


Fig. xi.

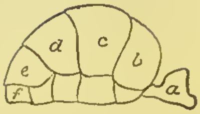


Fig. xii.

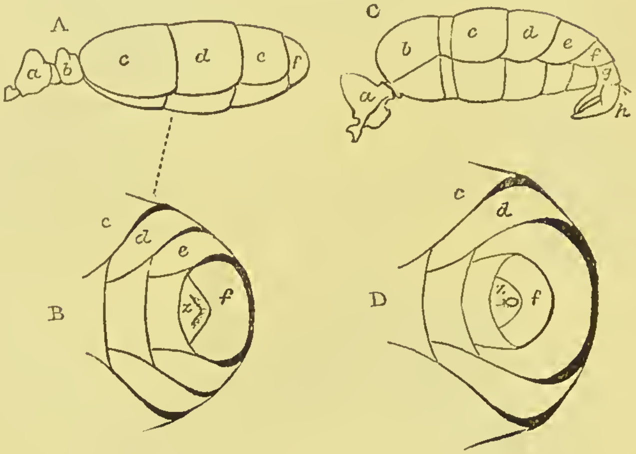


Fig. xiii.

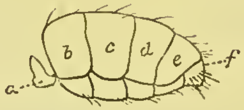


Fig. ix.—Abdomen *Ænictus* ☿.
" x.—Abdomen of ☿ of the *Ponerinæ*.
" xi.—Abdomen of ☿ of the *Dolichoderinæ*.
" xii.—A, B. Abdomen of ♀ of the *Myrmecinæ*.
C. Abdomen of ♂ of the *Ponerinæ*.
D. Abdomen of ♀ of the *Camponotinæ*.
" xiii.—Abdomen of ☿ of the *Camponotinæ*.

1st segment *a* is always modified into a highly flexible pedicel. The 2nd segment *b* is, in the majority of the genera, unmodified and forms part of the abdomen proper, but in the ☿ of one section of the *Dorylinæ* and in all the *Myrmecinæ* it is modified in a manner similar to the 1st segment, and then forms part of the pedicel. The abdomen proper is formed of the remaining segments, *b–f*, or *b–g* in the ♂; in the section of the *Dorylinæ* mentioned above and in the *Myrmecinæ*, *c–f*. The anal aperture marked *z* (fig. xii, B & D) is in the *Camponotinæ* circular and ciliated with hairs, and

in the other subfamilies linear in the form of a slit. In the ♂ the genitalia are often exserted, fig. xii, C *h*.

Many works have been compiled on the habits of ants, one of the latest and most interesting being 'Marvels of Ant Life,' by W. F. Kirby, F.L.S., F.E.S. This little book contains in a condensed form most of what was known up to three or four years ago of the conditions of life, the economy and habits of ants in general. For a popular special account, however, of Indian ants, reference should be made to a paper by Mr. R. C. Wroughton in vol. vii (1892) of the 'Journal' of the Bombay Natural History Society. Most interesting accounts also of the habits of some Indian ants are given by Mr. G. R. James Rothney in the 'Transactions' of the Entomological Society of London for 1889.

The correct classification of the genera and subfamilies of ants is still under discussion. The two great specialists in Myrmecology, Dr. Forel and Professor Emery, hold opposite views as to the relationship and arrangement of certain genera. In the present work I have followed Dr. Forel in limiting the subfamily *Dorylinæ* to two genera, *Dorylus* and *Ænictus*, and including in the *Ponerinæ* certain low forms of ants whose affinities, owing to our ignorance at present of their lives, development and habits, are doubtful. The following table gives briefly the distinguishing characters of the main divisions of the *Formicidæ*:—

Key to the Subfamilies of the Formicidæ.

☿ ☿.

A. Pedicel of the abdomen one-jointed.	
a. A more or less marked constriction between basal two segments of abdomen	*Ponerinæ*, p. 23.
b. No constriction between basal two segments of abdomen.	
a'. Anal aperture in form of a transverse slit.	
a^2. Eyes never present, blind	*Dorylinæ* *, p. 1.
b^2. Eyes always present	*Dolichoderinæ*, p. 288.
b'. Anal aperture circular	*Camponotinæ*, p. 308.
B. Pedicel of abdomen two-jointed	*Myrmecinæ*, p. 105.

In conclusion, my best thanks are due to Messrs. Smythies, Hauxwell, Thompson, Allan and Craddock, of the Forest Depart-

* The ☿ of one of the genera, *Ænictus*, has the pedicel two-jointed, as in the *Myrmecinæ*, but being without eyes and ocelli, it can only be confounded with the ☿ ☿ of the Myrmecine genera *Liomyrmex* and *Carebara*. In Indian species, however, *Liomyrmex* ☿ has 11-jointed, *Carebara* ☿ 9-jointed antennæ, whereas *Ænictus* ☿ has these organs 10-jointed. The general appearance of *Ænictus* ☿ is also so distinctive, that once known it cannot be mistaken for a species of any other genus.

ment in Burma, and to Mr. G. Rogers, late Deputy Conservator of Forests at Darjiling. All these gentlemen were good enough to procure ants for me, and my collection was thereby enriched by many species I should myself not have succeeded in capturing. To Mr. F. Möller of Tukvar, near Darjiling, I owe a very large collection of Sikhim ants; and I have to acknowledge with thanks the receipt of collections sent to me from time to time by Mr. E. E. Green and Mr. O. Wickwar from Ceylon. My most grateful acknowledgments are, however, due to Mr. R. C. Wroughton, Inspector General of Forests to the Government of India, and my friend Mr. G. A. James Rothney, who in the most generous manner placed at my disposal their rich collections of Indian ants. I have to thank Dr. Forel for the loan and gift of specimens, many of them single types, and for his unfailing kindness and courtesy in examining and identifying species for me. Dr. Forel's papers on Indian ants, published chiefly in the 'Journal' of the Bombay Natural History Society, have been of the greatest assistance to me, and I gratefully own that but for the publication of those papers, the labour of compiling the present work would have been far greater than it has been.

I am under great obligations for the loan or gift of specimens to Dr. R. Gestro of the Museo Civico, Genoa; to Mons. E. André of Gray, Haute-Saône, France; and to Professor Emery of Bologna. Also to the Authorities of the British Museum for free access to the collections at the Museum of Natural History, South Kensington.

The illustrations for this work have required great accuracy and care, and have been efficiently executed by the artist, Mr. H. Knight.

The systematic position of the *Chrysididæ* is in my opinion with the *Aculeata*, and the latter portion of this volume deals with the forms so far recorded from within our limits. I am greatly indebted to Major C. Nurse, of the Indian Army, for the kind gift and loan of many specimens.

NOTE.—Under *Tetramorium*, p. 175, the genus *Rhoptromyrmex* is wrongly ascribed to Forel. The correct reference is:—

Rhoptromyrmex, *Mayr, Ann. Hofmus. Wien*, xvi (1901), p. 18.

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Tribe HETEROGYNA.

Family FORMICIDÆ.

Subfamily DORYLINÆ.

The species contained in this subfamily are remarkable for the great difference between the worker (☿) and the male (♂), and also between the male (♂) and female (♀) so far as the last is known. The ♂ is a large wasp-like insect possessed of well-developed large eyes and ocelli; the ☿ of the two genera found within our limits is blind, and in an American genus has no facetted eyes but merely a single ocellus on each side of the head. The ♀ is apterous and blind, with an immensely developed massive abdomen a little resembling a ♀ termite.

The ☿ in the Indian species possesses a sting; the head may be rectangular or oval; the pedicel consists of one or two joints; the pupæ are enclosed in a cocoon.

Key to the Genera.

☿ ☿.

a. Pedicel one-jointed .... DORYLUS, p. 1.
b. Pedicel two-jointed .... ÆNICTUS, p. 6.

♂ ♂.

a. Of comparatively large size, length over 18 mm.; node of pedicel convex .... DORYLUS, p. 1.
b. Smaller, length under 13 mm.; node of pedicel concave, sometimes merely longitudinally grooved or bilobed, never convex .... ÆNICTUS, p. 6.

Genus DORYLUS.

Dorylus, *Fabr. Ent. Syst.* ii (1793), p. 365, ♂.
Typhlopone, *Westw. Introd. Classif. Ins.* ii (1840), p. 219, ☿.
Dichthadia, *Gerst. Stett. ent. Zeit.* xxiv (1863), p. 93, ♀ ?
Alaopone, *Emery, Ann. Mus. Civ. Gen.* xvi (1881), p. 274, ☿.

Type, *D. helvolus* ♂, Linn., from Africa.

Range. Africa and Asia.

The ♂, ♀, and ☿ of this genus differ very considerably in appearance, and were for a long time classed in different genera. The ♂ is a long, narrow-bodied, wasp-like insect, with very large and prominent eyes and ocelli; the mandibles are comparatively long, more or less flattened and curved inwards; the thorax is gibbous and raised above the plane of the head; posteriorly the median segment has always a more or less steep slope to the apex; the femora are always compressed. The pedicel is one-jointed, and either cup-shaped, rectangular, or square, invariably convex above and carinate beneath.

The ♀ is a heavy apterous insect bearing a general resemblance to the ♂, but differing considerably in the form of the thorax and pedicel.

The ☿ is destitute of eyes or ocelli, has the head more or less square or rectangular, the thorax and node of the pedicel flattened above, with the pro-mesonotal suture distinct and the meso-metanotal suture obsolete; the pedicel is one-jointed and the abdomen somewhat depressed.

The species of this genus form their nests in the ground, sometimes at a considerable depth. In India and Burma the ♂ is a well-known insect, coming freely in the evening into houses to lights. It is not unfrequently taken for a wasp. and there is a night-flying wasp (*Vespa dorylloides*) which, as the name implies, resembles *Dorylus* ♂.

Key to the Species.

♂ ♂.

A. Second joint of flagellum of antennæ pubescent beneath.
  a. Mandibles long, narrow, sickle-shaped, with a broad blunt tooth at base .... *D. labiatus*, p. 2.
  b. Mandibles short, very broad for half their length from base, then abruptly narrowed to an acute point.................................. *D. lævigatus*, p. 3.
B. Second joint of flagellum of antennæ not pubescent beneath, polished and shining .... *D. orientalis*, p. 4.

☿ ☿.

A. Mandibles without teeth on the masticatory margin, apex acutely pointed .... *D. lævigatus*, p. 4.
B. Mandibles with 2 teeth on the masticatory margin, apex broader.
  a. Antennæ ☿ maj. 11-, ☿ min. 10-jointed .... *D. labiatus*, p. 3.
  b. Antennæ ☿ maj. and ☿ min. 9-jointed...... *D. orientalis*, p. 5.

1. Dorylus labiatus, *Shuck. Ann. N. H.* v (1840), p. 319, ♂: *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), p. 464, ♂ ♀.

Dorylus hindostanus, *Smith, Cat.* vii (1859), p. 3, ♂.

Dorylus fulvus, var. labiatus, *Emery, Zool. Jahrb. (Syst.)* viii (1894–95), p. 709.

Dorylus (Typhlopone) lævi-ceps. *Smith, 2nd Yark. Miss., Hym.* p. 13, fig. 2, ☿.

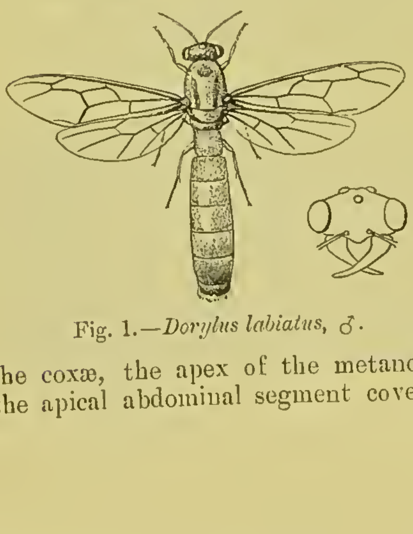


Fig. 1.—*Dorylus labiatus*, ♂.

♂. Brownish yellow, the head, except the mandibles, and the antennæ black, the legs darker than the body, the coxæ castaneous brown; the head, the coxæ, the apex of the metanotum and of the pedicel, and the apical abdominal segment covered with long yellowish curly

hair, the rest of the body with a very short, thin, fine, recumbent, pale pubescence; wings hyaline with a brownish tint. Head much broader than long, the vertex raised, the ocelli prominent; the mandibles long, sickle-shaped, bearing at base on the inside a rounded tubercle. Thorax massive, very gibbous in front, the mesonotum with a short longitudinal carina above the base of the wings on each side; scutellum large, prominent; postscutellum narrow, sunk between the scutellum and metanotum, the latter truncate posteriorly. Node of the pedicel longer than broad, with a strong gnomon-shaped keel beneath, convex above; legs moderately long, very smooth, polished and shining; abdomen cylindical, long, twice the length of the head and thorax united, clavate towards the apex and slightly curved downwards.

☿ *maj.* Castaneous yellow, highly polished, smooth and shining, the head, thorax and abdomen with minute scattered punctures, the head beneath near the mandibles and the apex of the abdomen with a few erect yellow hairs. Head rectangular, much longer than broad, and broader in front than posteriorly, the occiput widely emarginate; clypeus narrow, transverse; antennal carinæ

Fig. 2.—*Dorylus labiatus*, ☿ maj., head.

Fig. 3.—*Dorylus labiatus*, ☿ min.

short, very close together and prominent, no longitudinally impressed line on the head. Thorax rectangular, depressed, slightly constricted at the pro-mesonotal suture: legs robust, short. Node of pedicel longer than broad; abdomen elongate, massive.

☿ *min.* Similar, smaller, lighter in colour.

Length, ♂ 30–33; ☿ *maj.* 6·8; ☿ *min.* 2·5–4 mm.

♀ unknown.

Hab. The whole continent of India, not recorded from Ceylon or from countries east of the Bay of Bengal.

2. **Dorylus lævigatus**, *Smith* (Typhlopone), *Jour. Linn. Soc.* ii (1857), p. 70, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), p. 464, ☿ ♂ ?
? Dichthadia glaberrima, *Gerst. Stett. ent. Zeit.* xxiv (1863), p. 93, ♀.
? Dorylus klugi, *Emery, Ann. Mus. Civ. Gen.* xxv (1887), p. 448, ♂.
Dorylus (Typhlopone) breviceps, *Emery, op. cit.* xxvii (1889), p. 488, ☿.

♂. Dusky brownish yellow, with a long, fairly abundant, semi-erect covering of yellow hairs, and beneath it, especially on the

abdomen, a pale sericeous pubescence; head and scape of the antennæ fuscous black or brown, flagellum of the antennæ, mandibles, and legs castaneous; wings hyaline with a fulvous brownish tint. Head short, transverse, the region of the ocelli only slightly raised. Thorax gibbous in front; mesonotum very convex; scutellum prominent, the apex bearing a longitudinal impression; metanotum rounded posteriorly; legs very short. Node of pedicel broader than long, very convex and rounded above; abdomen massive, robust, curved downwards, clavate towards the apex.

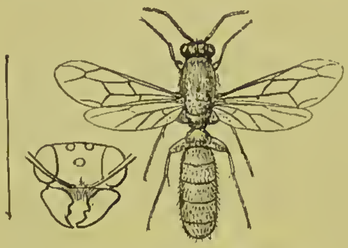


Fig. 4.—*Dorylus lævigatus*, ♂.

☿ *maj.* Castaneous brown, smooth and shining, punctures very small and sparse. Head rectangular, much longer than broad, the occiput emarginate, the front of the head bearing a short medial longitudinally impressed line or furrow. Thorax short, flat above, about as long as the head; legs short, robust. Node of the pedicel much broader than long, anteriorly with a gradual slope forwards, posteriorly vertical; abdomen massive, somewhat lighter in colour than the head and thorax.

Fig. 5.—*Dorylus lævigatus*, ☿ maj.

☿ *min.* Similar, smaller, much lighter in colour.

♀. Apterous, reddish brown, smooth and shining. Head broad, transverse, destitute of eyes or ocelli; the mandibles narrow, sickle-shaped; antennæ short, geniculated; the flagellum 11-jointed; thorax somewhat narrow and constricted; legs short and feeble, claws simple; pedicel with a trapezoidal node, broader than long, widely separated from the 1st abdominal segment; abdomen very long, heavy and massive. (*After Gerstäcker.*)

Length, ♂ 24; ♀ 32; ☿ *maj.* 8; ☿ *min.* 4–5 mm.

Hab. Lower Burma, near Rangoon (*Fea*); Tenasserim, Haungdraw valley, Mergui (*Bingham*). Found also in Borneo and Java.

3. **Dorylus orientalis**, *Westw. P. Z. S.* v (1835), p. 72, ♂; *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), p. 463, ♂ & ☿.
Dorylus longicornis, *Shuck. Ann. N. H.* v (1840), p. 321, ♂.
Labidus (Typhlopone) curtisi, *Shuck. t. c.* p. 265, ☿.
Alaopone oberthuri, *Emery, Ann. Mus. Civ. Gen.* xvi (1881), p. 274, ☿.

♂. Brownish yellow, the mandibles and legs castaneous

brown, pubescent and very hairy, the hairs erect, yellow, and most dense under the head, on the sides and beneath the thorax, and at the apex of the abdomen; pubescence pale, dense, fine and silky; wings flavo-hyaline. Head narrow, transverse, eyes and ocelli large; mandibles short, broad, porrect, blunt at apex and with a blunt tooth on the inner margin at base. Thorax massive, gibbous in front; scutellum compressed; postscutellum narrow, sunk between the scutellum and metanotum, basal portion of the latter depressed, flat, apex truncate; legs short and robust. Node of pedicel somewhat square, convex above, slightly contracted anteriorly and posteriorly; abdomen long, cylindrical, massive, clavate towards the apex, and curved downwards.

Fig. 6.—*Dorylus orientalis*, ♂.

☿ *maj.* Castaneous brown, with the abdomen generally lighter in colour than the head and thorax; head and thorax densely, abdomen more lightly punctured; pubescence almost entirely wanting, a few yellow erect hairs on the front of the head, at the apex of and beneath the abdomen. Head rectangular, occiput deeply emarginate; the head slightly wider anteriorly than posteriorly, a deeply impressed medial line or furrow down the front. Thorax elongate, somewhat rectangular, but rounded anteriorly, depressed and flat above, constricted at the pro-mesonotal suture; legs short and robust. Node of pedicel broader than long, transverse anteriorly and posteriorly; abdomen depressed above, about as long as the thorax and node of pedicel united.

Fig. 7.—*Dorylus orientalis*, ☿ maj.

☿ *min.* Similar, very much smaller and very much lighter in colour, being of a pale honey-yellow; occiput not emarginate, front of the head not furrowed; node of the pedicel rounded above.

♀ unknown.

Length, ♂ 17–23; ☿ *maj.* 5–6; ☿ *min.* 2·5–3 mm.

Hab. Throughout India, Burma, and Ceylon, extending to the Malay Peninsula, Borneo, Sumatra, and Java.

The males of this species are very variable, and can be separated into three races or subspecies, but these are not constant and grade one into the other. The eastern race coming from the hot moist area of Burma and Tenasserim is, as one would expect, darker, and has been separated as *D. fuscus* by Emery (Ann. Mus. Civ. Gen. xxvii (1889), p. 487). *D. longicornis*, Shuck., has the head black, and occurs along with the typical form over the whole of India.

Genus ÆNICTUS

Ænictus, *Shuck. Ann. N. H.* v (1840), p. 266, ♂.
Typhlatta, *Smith, Jour. Linn. Soc.* ii (1858), p. 79, ☿.

Type, *Æ. ambiguus*, Shuck., N.W.P. India.
Range. Africa, Asia, Australia.

The ♂ of this genus very much resembles the ♂ of *Dorylus*, but it is always smaller, and the one-jointed pedicel is never very convex, generally concave or flat above. Head small, transverse, flat; eyes and ocelli very large and prominent; mandibles sometimes long, sickle-shaped and cylindrical, sometimes broad and flat; scape of the antennæ, femora, and tibiæ of the legs sometimes cylindrical, sometimes flat and even, greatly widened and foliaceous; pedicel one-jointed, carinate beneath. Wings hyaline and generally more or less iridescent, nervures and stigma fulvous yellow to dark brown. Abdomen long, cylindrical, generally slightly clavate and curved downwards.

☿. Blind, destitute of eyes or ocelli; antennæ 10-jointed. Thorax with the pro-mesonotal suture obsolete; the meso-metanotal suture distinct, the thorax above at this point being often widely emarginate. Pedicel two-jointed, as in the subfamily *Myrmicinæ*. The ☿, so far as is known, is never dimorphous or polymorphous, as in the genus *Eciton*, which replaces *Ænictus* in the New World. ♀ unknown.

The workers of *Ænictus* hunt in columns of three or four abreast, marching with great regularity. Mr. Wroughton (Jour. Bomb. N. H. Soc. vii (1892), pp. 177, 178) has given an interesting account of their habits.

Like the ♂ of *Dorylus*, the ♂ of this genus is greatly attracted by light, and is frequently taken in houses in the evening. The ♂ and ☿ of only one species (*Æ. wroughtoni*, Forel) have been taken associated together.

Key to the Species.

♂ ♂.

A. Scape of the antennæ cylindrical.
  a. Mandibles with a tooth on inner side close to the base .... *Æ. arya*, p. 8.
  b. Mandibles not toothed.
    a'. Posterior border of hypopygium medially emarginate .... *Æ. gleadowi*, p. 8.
    b'. Posterior border of hypopygium entire.
      *a*². Pygidium round, convex, without any longitudinal impression .... *Æ. westwoodi*, p. 10.
      *b*². Pygidium with a longitudinal impression.
        *a*³. Pedicel above concave, the sides sharply raised, not broadly rounded. *Æ. ambiguus*, p. 9.
        *b*³. Pedicel above with a rather narrow longitudinal groove, the sides broadly rounded above .... *Æ. pubescens*, p. 10.
B. Scape of the antennæ more or less compressed, flat.
  a. Of large size. Length 12–13 mm. ...... *Æ. grandis*, p. 11.

b. Smaller. Length under 11 mm.
  a'. Mandibles with a tooth on inner margin at base .... *Æ. greeni*, p. 11.
  b'. Mandibles not toothed.
    a². Posterior border of hypopygium broadly emarginate.
      a³. Head transverse; distance between articulation with thorax and front distinctly less than distance between eyes .... *Æ. shuckardi*, p. 12.
      b³. Head rounder, distance between articulation with thorax and front about equal to distance between eyes. *Æ. clavatus*, p. 12.
    b². Posterior border of hypopygium entire, not emarginate.
      a³. Posterior border of pygidium medially emarginate .... *Æ. longi*, p. 13.
      b³. Posterior border of pygidium entire, not emarginate.
        a⁴. Mandibles strongly convex exteriorly, sickle-shaped, without any projection on inner margin at base.
          a⁵. Length 9–10·5 mm. .... *Æ. feæ*, p. 14.
          b⁵. Length 5–6 mm. .... *Æ. wroughtoni*, p. 16.
        b⁴. Mandibles flat and broad at base, diminishing rapidly to an acute point at apex, broadened at base by a rounded projection on the inner margin.
          a⁵. Tibiæ strongly clavate, apical two-thirds greatly enlarged. Carina beneath node of pedicel not prolonged posteriorly into a tooth .... *Æ. clavitibia*, p. 14.
          b⁵. Tibiæ not so strongly clavate, apical two-thirds only slightly enlarged. Carina beneath node of pedicel prolonged posteriorly into a tooth...... *Æ. latiscapus*, p. 15.

☿ ☿.

A. Head with an oval yellowish or reddish-white spot on each side.
  a. The lateral spots on head placed high up, their posterior margins prominent, forming small tubercles.................... *Æ. martini*, p. 17.
  b. The lateral spots on head placed lower down, their posterior margins not prominent, not forming tubercles.
    a'. Posterior margin of head transverse, as wide as in front .... *Æ. fergusoni*, p. 18.
    b'. Posterior margin of head not transverse, narrower than in front.
      a². Length under 4 mm.; 1st joint of pedicel finely reticulate but shining.. *Æ. læviceps*, p. 18.
      b². Length over 4 mm.; 1st joint of pedicel coarsely sculptured, rugose, not shining...................... *Æ. binghami*, p. 18.

B. Head without lateral spots.
- *a*. Head and thorax sculptured.
  - *a'*. Thorax very coarsely rugose, the sculpture forming coarse longitudinal wrinkles .... *Æ. aitkeni*, p. 19.
  - *b'*. Thorax finely rugose, the sculpture not forming longitudinal wrinkles .... *Æ. pachycerus*, p. 20.
- *b*. Head smooth and shining; thorax only sculptured.
  - *a'*. Scape of antennæ very short, about half length of head without mandibles .... *Æ. brevicornis*, p. 21.
  - *b'*. Scape of antennæ longer, as long as, or longer than, head without mandibles.
    - *a*². Mandibles triangular, masticatory margin broad.
      - *a*³. Thorax entirely smooth and shining. *Æ. wroughtoni*, p. 17.
      - *b*³. Thorax posteriorly finely rugulose, opaque........................ *Æ. punensis*, p. 21.
    - *b*². Mandibles narrow linear, masticatory margin with three teeth.
      - *a*³. Metanotum finely regulose, not striate .... *Æ. peguensis*, p. 22.
      - *b*³. Metanotum punctured, the punctures running into longitudinal striæ .... *Æ. ceylonicus*, p. 22.

4. **Ænictus arya**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 468 & 472, ♂.

♂. Head dark castaneous brown; thorax and abdomen yellow, slightly fuscous above: mandibles, antennæ and legs pale yellow; head in front with long erect hairs; the thorax, pedicel and abdomen with short, somewhat sparse, recumbent, whitish pubescence, which is a little more dense on the pedicel. Head arched above, the cheeks behind the eyes not so constricted as in *Æ. ambiguus*, the front of the head flat, the antennæ comparatively short and thick. Thorax with the mesonotum only slightly convex, and the scutellum not prominent; legs with the femora and tibiæ cylindrical. Pedicel slightly concave above, the sides barely raised and divergent posteriorly; abdomen short; pygidium with a longitudinally impressed short line.

Length, ♂ 4·5–5 mm.

Hab. Kanara (*Wroughton*).

5. **Ænictus gleadowi**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 468 & 469, ♂.

♂. Head black; thorax dark brown; mandibles, antennæ, and legs brownish yellow; abdomen dull pale yellow; the head in front, the mandibles, thorax, legs, pedicel and abdomen densely pubescent, the pubescence long on the thorax and abdomen, hiding the sculpture, short on the mandibles, antennæ and legs. Head constricted behind the eyes, smooth and shining, slightly concave in front and punctured. Thorax not very convex above, the mesonotum with a medial longitudinally-impressed line in front; scutellum truncate posteriorly, the posterior lateral angles

prominent; legs robust, the femora slightly compressed, the tibiæ cylindrical. Pedicel broadly longitudinally sulcate, the sides rounded anteriorly, angular posteriorly; abdomen rather short, about the length of the head and thorax united.

Length, ♂ 9–9·5 mm.

Hab. Kanara (*Wroughton*).

6. **Ænictus ambiguus**, *Shuck. Ann. N. H.* v (1840), p. 268, ♂; *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), p. 467.

♂. Head jet-black, shining; thorax deep brown; antennæ, mandibles, legs, and abdomen yellow. Head constricted behind the eyes, smooth and shining at back, with short erect pubescence in front; mandibles long, sickle-shaped. Thorax very convex above; scutellum prominent, truncate, or slightly emarginate posteriorly, overhanging the postscutellum and metanotum; this

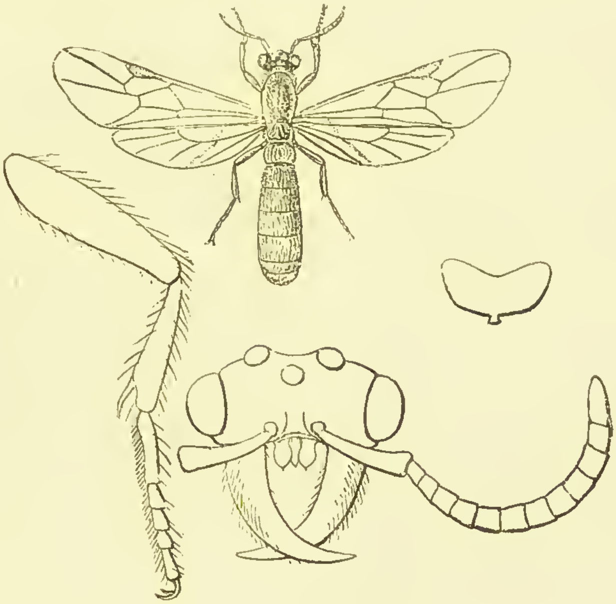


Fig. 8.—*Ænictus ambiguus*, ♂.

last almost vertical, with little or no basal portion; the whole thorax covered with long, recumbent, whitish-yellow hairs; legs comparatively long, with the femora and tibiæ cylindrical, not compressed, and only very slightly and gradually clavate towards the apex; wings clear hyaline, nervures yellowish brown. Pedicel about as wide as the base of the abdomen, concave from right to left, the sides parallel; abdomen subclavate, bent downwards, pubescent, the hairs long, yellowish white, recumbent.

☿ unknown.

Length, ♂ 7·5–8 mm.

Hab. N.W. Provinces, India (*Brit. Mus.*); Sikhim, Rungit Valley (*Möller*); Western India, Guzerat, Poona (*Wroughton*).

7. **Ænictus westwoodi**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 467 & 469.

♂. Head jet-black and shining posteriorly; the front, the base of the mandibles, and the thorax brownish yellow; the antennæ, legs and abdomen dull pale yellow. Head constricted behind the eyes as in *Æ. ambiguus*, and devoid of pubescence posteriorly, the front covered with long pale yellow hairs; mandibles long, curved, acute at apex; scape of the antennæ slightly clavate; flagellum a little thicker in the middle than at base and apex. Thorax above not so convex as in *Æ. ambiguus*; the scutellum prominent, its posterior lateral angles slightly produced; metanotum with a very short, slightly oblique, but distinct basal portion; legs short, with the femora and tibiæ cylindrical; the thorax and legs covered with a short, fine, yellowish-white pubescence. Node of the pedicel a little narrower at base than at apex, deeply grooved or concave above, carinate beneath; abdomen very massive, covered with a fairly dense, short, fine yellowish-white pubescence; the pygidium very convex, its base smooth and shining.

Length, ♂ 9–10 mm.

Hab. Western India (*Wroughton*).

Dr. Forel has described this as a mere variety of *Æ. ambiguus*, but it seems to me to differ structurally.

8. **Ænictus pubescens**, *Smith, Cat.* vii (1859), p. 10; *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), p. 469.

♂. "Length 3½ lines (about 7·5 millim.). Rufo-testaceous, densely clothed with pale pubescence: the head black and shining, the mandibles and antennæ rufo-testaceous; the ocelli in a curve on the vertex and situated on the side of a central elevation; the mandibles long and curved. The thorax obscure ferruginous; wings hyaline and iridescent, the nervures and stigma brown. Abdomen densely clothed with long silky decumbent pubescence; the peduncle deeply concave above and channeled in the middle, slightly rounded at the sides; the peduncle of the same width as the 2nd segment, the terminal segment obtuse.

"*Hab.* Northern India." (*Smith.*)

I have quoted in full Mr. Smith's original description, as the species is unknown to me except from the mutilated type in the British Museum, which is minus the pedicel and abdomen.

Another doubtful species is *Æ. certus*, described by Westwood without locality (Arcan. Entom. i, 2 (1842), p. 79). The type is in the British Museum, but is in very bad condition. Dalla Torre, in his Catalogue of the *Formicidæ*, gives the habitat of this species as India; but on what authority I do not know. I give a brief description:—

Ænictus certus, Westw.

♂. Closely resembles *Æ. ambiguus*, Shuck., but is smaller and lighter in colour. Head black; thorax, legs and abdomen honey-

yellow: head transverse, but longer than in *Æ. ambiguus*; scutellum not so prominent, narrower and compressed; metanotum with a very distinct basal portion. Pedicel flat above, a little concave at the extreme base; pygidium strongly convex, entire, with no longitudinally impressed medial line.

9. **Ænictus grandis**, sp. n.

♂. Head jet-black, polished and shining; mandibles, antennæ, thorax, legs, pedicel and abdomen castaneous brown, the thorax and abdomen somewhat fuscous above; the mandibles, antennæ and front of the head with fairly long, erect, glistening yellow hairs, the thorax and abdomen with somewhat sparse, short, recumbent pubescence of the same colour; wings fusco-hyaline, nervures brown. Head about twice as broad as long; eyes comparatively small, anterior; the cheeks well developed and rounded; the occiput somewhat flat; mandibles long, flat, not much curved; antennæ long, the scape very broad, flat and foliaceous; flagellum cylindrical. Thorax massive; mesonotum with a short, medial, longitudinally impressed line in front; scutellum rounded posteriorly; metanotum with a short but distinct oblique basal portion; legs with the femora spatulate, tibiæ clavate. Node of pedicel from above semicircular, flat or slightly longitudinally convex; the apex transverse, beneath carinate, the carina ending in a strong tooth posteriorly; abdomen massive, enlarged towards the apex; the pygidium strongly convex above, its posterior margin entire; hypopygium with its posterior margin truncate.

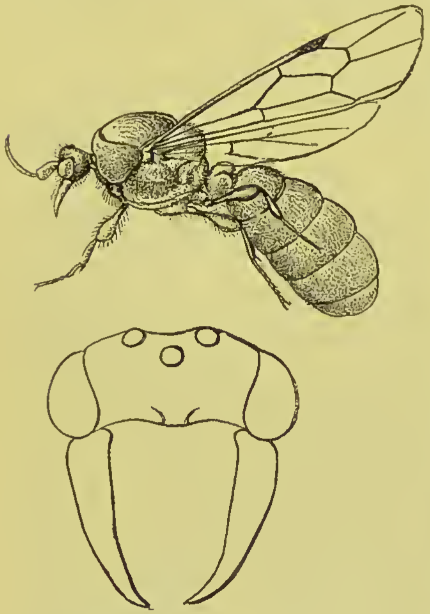


Fig. 9.—*Ænictus grandis*, ♂.

Length, ♂ 12–13 mm.

Hab. Lower Burma, Toungoo (*Hauxwell*).

The largest known species of the genus.

10. **Ænictus greeni**, sp. n.

♂. Resembles *Æ. grandis* in colour and in the shape of the pedicel, but is very much smaller and more pubescent. Dark castaneous brown, the head black, the mandibles, antennæ and

legs deep shining yellow; the head in front, the thorax, pedicel and abdomen covered with dense, very short, erect, yellow hairs. Head not quite twice as broad as long; the cheeks behind the eyes not constricted, rounded and well developed; the mandibles flat and proportionately broader, though not so long as in *Æ. grandis*, the tooth on the inner side at base distinct and acute. Thorax very gibbous in front, more so than in any other known Indian species; the scutellum broad and rounded posteriorly; legs with the femora and tibiæ gradually thickening from base to apex. The pedicel flat or slightly convex in the middle; abdomen cylindrical, not enlarged towards the apex nor curved downwards; pygidium convex, shining, punctured at base, its apical margin rounded, entire; hypopygium broad, posteriorly widely emarginate.

Length, ♂ 5 mm.

Hab. Ceylon (*Green*).

It is possible this may be the ♂ of *Æ. ceylonicus*, Mayr.

11. **Ænictus shuckardi**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp 467 & 471, ♂.

♂. Head jet-black, smooth and shining; mandibles, antennæ, thorax, legs, pedicel and abdomen ochraceous brown, the abdominal segments above darker in the middle; pubescence short, fine, fairly dense and erect, of a brownish-yellow colour. Head concave in front; the cheeks behind the eyes fairly well developed, not flat and constricted as in *Æ. ambiguus*; mandibles flat, strongly curved, somewhat short and not very acute at apex. Thorax with the mesonotum strongly convex, the scutellum broad and rounded posteriorly, the metanotum vertical without any basal portion; legs with the femora and tibiæ clavate, the latter not quite so swollen at apex as in *Æ. greeni*. Pedicel flat, its upper surface semicylindrical, the sides only slightly raised, the apex transverse; abdomen cylindrical, only very slightly larger towards the apex; the pygidium narrow, transverse, slightly convex, very highly polished and shining, its posterior margin entire; hypopygium flat, its posterior margin transverse.

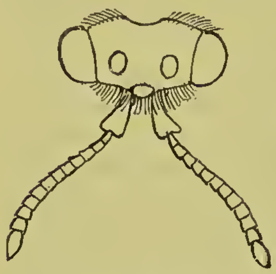


Fig. 10.
Ænictus shuckardi, ♂.

Length, ♂ 5–6 mm.

Hab. Bengal (*Rothney*); Burma; Tenasserim (*Bingham*).

12. **Ænictus clavatus**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 467 & 471.

♂. Head dark castaneous brown, almost black; thorax and abdomen ochraceous; mandibles, antennæ and legs paler yellow. Head, thorax and abdomen covered with a fairly abundant, very

short, pale pubescence, somewhat longer and recumbent on the sides of the apical half of the abdomen; wings hyaline, nervures yellowish brown. Head posteriorly wider than in *Æ. shuckardi*; the cheeks behind the eyes well developed and broad; head in front slightly concave, vertex not much arched; ocelli rather distant from each other; mandibles narrower than in *Æ. shuckardi*, short and much curved. Thorax with the mesonotum very convex in front; scutellum broad, prominent, rounded, posteriorly not overhanging the metanotum, which has a distinct horizontal basal portion, the apical portion vertical and truncate; legs with the femora and tibiæ attenuate at base, strongly clavate towards the apex. Pedicel very slightly concave above, very thick, semicircular in shape; the apex transverse, laterally slightly compressed, the sides flat and vertical; abdomen comparatively short, cylindrical, the pygidium entire.

Fig. 11.
Ænictus clavatus, ♂.

Length, ♂ 5 mm.

Hab. Western India, Guzerat, Kanara (*Wroughton*); Sikhim (*Bingham*).

A variety with the pubescence somewhat more dense has been named var. *kanarensis* by Dr. Forel.

13. **Ænictus longi**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 467 & 470, ♂.

♂. Mandibles long and somewhat obtuse at apex, the joints 2–9 of the flagellum of the antennæ thicker than long; eyes not reaching the posterior margin of the head, the latter feebly convex and distinct from the articulation with the thorax; ocelli large, not placed on an eminence; head without the eyes about as long as broad. Pedicel concave above with the sides raised, broader than long, broader posteriorly than in front, beneath tuberculate; wings short, basal portion of the metanotum indistinct, almost obsolete. Front subopaque, densely punctured; thorax and abdomen more distantly punctured. Head, thorax and abdomen densely pubescent. Pygidium smooth and shining, with a longitudinal impression, and its posterior border medially emarginate. Scape of the antennæ and femora only moderately thickened from base to apex.

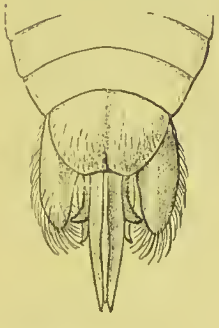


Fig. 12.
Ænictus longi, ♂.

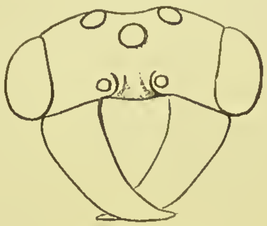
Length, ♂ 7 mm.

Hab. The Gáro Hills, Assam (*Long*); Burma, Pegu (*Bingham*).

Sufficiently distinguished by its emarginate pygidium.

14. **Ænictus feæ**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 486, pl. x, figs. 4-9, ♂; *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), p. 467, ♂.

♂. Fuscous; head piceous; the sutures of the thorax, apex and margins of the segments of the abdomen, mandibles, antennæ and legs more or less reddish, or the abdomen entirely ferruginous-rufescent; pubescence hoary, the front, the mandibles, antennæ, legs, the thorax beneath, and the abdomen at apex pilose. Head with the front lightly concave, the antennal carinæ produced and forming tooth-like projections; scape of the antennæ strongly dilated and compressed; flagellum fusiform, its middle joints as wide as long; occiput in the region of the ocelli smooth, highly polished and shining; scutellum moderately convex, not remarkably gibbous or prominent. Pedicel transverse, the sides rounded, their margin acute, the posterior border widely emarginate above, the sides are lightly punctured, the middle smooth and depressed but not distinctly sulcate. The 5th abdominal segment strongly convex, not longer than the 4th; segments 2–5 lightly punctured, with deeper piligerous punctures intermixed. Genital valves medially narrow at apex, curved outside, armed interiorly with a spine. Legs with the base of the femora attenuate, the apex clavate and compressed. Wings infuscate, the costal margin piceous, the discoidal and cubital cells subequal.



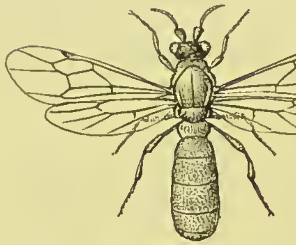


Fig. 13.—*Ænictus feæ*, ♂.

Length 9·5–10·5 mm. Anterior wing 7·5–8·5 mm.

Hab. Burma; Tenasserim (*Fea* and *Hauxwell*), Upper Burma, Southern Shan States (*Thompson*).

A mutilated specimen which I attribute to this species was procured by Thompson at Taunggyi, 4000 ft.

15. **Ænictus clavitibia**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 467 & 472, ♂.

♂. Head jet-black, with short erect hairs on the front; mandibles, antennæ, thorax, legs, pedicel and abdomen shining light honey-yellow, with a brownish tint on the thorax and abdomen above; the mandibles, antennæ, thorax, legs, pedicel and abdomen covered with a dense, very short, and fine pale pubescence, clearly visible against the light. Head transverse, ocelli raised; eyes prominent; front truncate or very slightly concave; cheeks fairly

broad and well developed, but flat and converging posteriorly to the occipital articulation with the thorax; mandibles broad at base, narrowing to an acute point at apex. Thorax convex above; scutellum broad and prominent, with the apex well rounded; metanotum arched, vertical, with no visible basal portion; wings hyaline, slightly iridescent; legs with the femora compressed, spatulate, the tibiæ very strongly clavate towards their apex, attenuate at base. Pedicel slightly broader than long, concave above, carinate beneath: abdomen curved, cylindrical, very slightly larger towards the apex; pygidium entire, very convex.

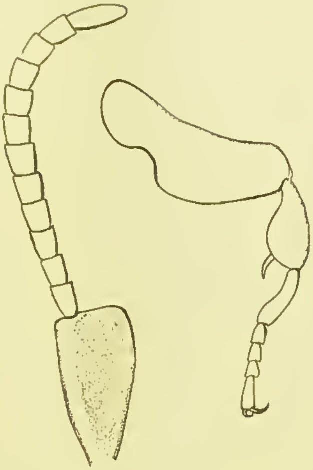


Fig. 14.—*Ænictus clavitibia*, ♂.

Length 6·5 mm.

Hab. Bengal, Barrackpore (*Rothney*); Burma (*Bingham*).

16. **Ænictus latiscapus**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 467 & 471, ♂.

♂. "Mandibles much longer and more curved than in the two

Fig. 15.—*Ænictus latiscapus*, ♂.

preceding species [i. e. *Æ. shuckardi* and *Æ. clavatus*], very broad at base and comparatively attenuate at apex (somewhat like the

mandibles in *Dorylus helvolus*), smooth and shining, slightly punctured, covered with long curved hairs. Head like that of *Æ. gleadowi*, transverse, much wider than long without the eyes, widely and deeply concave in front, the articulation with the thorax forming the posterior margin; ocelli raised; head very convex posteriorly from one eye to the other, while both eyes are prominent anteriorly. Antennal carinæ small and very close together, confluent posteriorly in the hollow of the face. The scape, dilated and thin as a leaf, is nearly translucid and a little twisted. Flagellum not incrassate, all the joints longer than wide. Mesonotum very convex anteriorly. The rest of the thorax, as in *Æ. clavatus*, with the scutellum very convex and prominent, but the basal portion of the metanotum is shorter, extremely short, convex, passing with a curve into the oblique portion which is a little concave. Abdomen curved, rather narrow; pygidium entire. Femora and trochanters foliaceous like the scape. Tibiæ slightly clavate towards their apical two-thirds. Pedicel deeply emarginate in front and posteriorly, twice as broad as long, rather concave above. Beneath is a protuberance armed with a strong tooth pointing backwards. Wings a little shorter than in *Æ. clavatus*. Smooth and shining, with a scattered but distinct puncturing. Pygidium very smooth, nearly devoid of any punctures. Legs and antennæ with long, yellow, curly hair; the rest of the body nearly devoid of erect hairs. Pubescence yellow, moderately plentiful, not hiding the sculpture. Yellow, a little brownish around the mandibles. Head brown. Wings hyaline, covered with fine pubescence nearly microscopic, nervures pale; stigma brownish yellow." (*Forel.*)

Length, ♂ 5·4–5·6 mm.

Hab. Poona (*Wroughton*); Rangoon, Burma (*Brit. Mus.*).

I quote Dr. Forel's very full description as the specimen in the British Museum collection, which I identify as this species, is darker and more punctured. It is probably only a variety.

17. **Ænictus wroughtoni**, *Forel, Ann. Soc. Ent. Belgique*, xxxiv (1890), *C. R.* p. ciii, ☿ ♂; *Jour. Bomb. N. H. Soc.* v (1890), p. 389, and xiii (1901), pp. 466 & 468, ☿ ♂.

♂. Dark castaneous brown, shining; head nearly black, the mandibles, antennæ, legs and abdomen yellow, the last slightly fuscous above. Head in front, the thorax and pedicel with long recumbent whitish pilosity; abdomen glabrous, almost devoid of pubescence. Head flat or slightly concave in front, eyes anterior, the cheeks well developed, broad; the ocelli prominent, placed on an eminence; the top of the head behind them flat; mandibles proportionately large, broad, curved, convex on the outer side. Thorax massive, the mesonotum high and convex, the scutellum prominent, rounded, not overhanging the metanotum, this last almost vertical, with the basal portion nearly obsolete; legs with the femora compressed, the tibiæ clavate, but not so swollen at apex as in *Æ. shuckardi* or *Æ. greeni*. Pedicel concave above

with the sides strongly curved and rounded, the posterior margin transverse; abdomen about as long as the head, thorax and pedicel united, cylindrical, slightly enlarged towards the apex, and curved downwards; pygidium convex, entire.

☿. Reddish yellow, darkest on the head, smooth and shining, with a few scattered erect pale hairs on the thorax and abdomen, hairs on the legs a little more dense and oblique, almost recumbent. Head broadly oval, very convex in front; mandibles triangular, with a toothed masticatory margin. Thorax comparatively long; pronotum broad and very convex; metanotum slightly compressed, the apical portion nearly vertical, bordered by a fine carina; legs stout, long: femora and tibiæ cylindrical, the latter attenuate at base, gradually clavate towards the apex. Nodes of pedicel from above roundly oval, rather distant one from the other; abdomen broad, convex, not depressed.

Length, ♂ 5·3–5·5; ☿ 2·5 mm.

Hab. Western and Central India (*Gleadow*, *Betham* and *Wroughton*); Travancore (*Ferguson*).

A variety slightly larger and more stoutly built, with a shorter head and of a deeper yellow-red colour, procured at Dharmsála in the Punjab, has been separated by Dr. Forel as var. *sagei*.

18. **Ænictus martini**, *Forel, Jour. Bomb. N H. Soc.* xiii (1901), pp. 464 & 473, ☿.

☿. Head, thorax, pedicel and abdomen dark castaneous brown, almost black in parts; mandibles, antennæ and legs castaneous red, the lateral spots on the head yellowish white, sometimes reddish yellow; pubescence almost wanting; head, thorax and abdomen with a few scattered erect hairs, the antennæ and legs densely hairy. Head somewhat longer than broad and broader in front than posteriorly, mandibles rather narrow, the apical tooth acute and curved. Thorax with the pronotum rounded and convex, narrower than the head; the metanotum slightly compressed, rounded above, delicately rugulose; legs with the femora incrassate in the middle, the tibiæ cylindrical, slightly thickening towards the apex. Nodes of the pedicel rounded, convex; abdomen broadly oval, smooth, highly polished and shining.

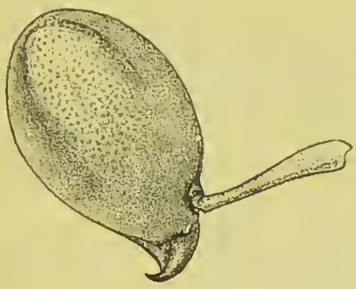


Fig. 16.—*Ænictus martini*, ☿.

Length, ☿ 3–3·5 mm.

Hab. Upper Burma, Maymyo, 3000 ft. (*Bingham*); Pegu Yoma (*Allan*); Tenasserim (*Hodgson*); extending to the Malay Peninsula.

19. **Ænictus fergusoni**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 465 & 473, ☿.

☿. Reddish brown or piceous brown, the lateral yellow spots on the head placed high up but not so high as in *Æ. martini*; the head, thorax and abdomen with scattered semi-erect pale hairs, more dense on the antennæ and legs. Head smooth, shining, very broad posteriorly, as broad as in front; mandibles broad, armed with minute teeth. Thorax very convex in front, rounded above; the pronotum smooth and shining, the emargination in the middle of the thorax very distinct, wide and shallow; the metanotum delicately rugulose, the basal portion short, shorter than in *Æ. læviceps*, the apical portion vertical, bordered by a carina above and on the sides; legs robust, moderately long, the femora strongly clavate, the tibiæ less so. Pedicel long, the nodes rounded, smooth and shining; abdomen oval, anteriorly at its junction with the posterior node of the pedicel constricted into a short neck.

Length, ☿ 3·5–4·5 mm.

Hab. Travancore (*Ferguson*); Western India, Surat (*Wroughton*); Sikhim (*Wroughton*); Burma (*Hodgson*).

Dr. Forel has described three varieties of this species: var. *piltzi*, Western India, which has the emargination in the thorax very marked and profound; var. *hodgsoni*, the Burmese form from a hot moist locality, naturally darker, and slightly larger; and var. *montanus*, from Sikhim, approaching much closer to *Æ. læviceps*, having the anterior node of the pedicel sculptured and rugose.

20. **Ænictus læviceps**, *Smith* (Typhlatta), *Jour. Linn. Soc.* ii (1858), p. 79, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), p. 465, ☿.

☿. Black or dark castaneous brown, the mandibles, antennæ, and legs reddish brown; head, thorax and abdomen covered with sparsely scattered long soft hairs. Head oval, highly polished, smooth and shining, with lateral yellowish-white spots as in *Æ. martini*, but lower down on the side of the head not forming tubercles; mandibles obsoletely finely striate at base; clypeus carinate; antennæ massive, somewhat pilose; antennal hollows deep and wide. Thorax: the pronotum highly polished, smooth and shining, the meso- and metanotum punctate-reticulate, opaque; legs smooth, rather long and stout. Pedicel with the 1st node slightly reticulate-punctate, but shining; 2nd node and rest of the abdomen highly polished and shining.

Length, ☿ 3·5–3·8 mm.

Hab. Assam (*Smythies*); Upper Burma, Southern Shan States (*Thompson*); Borneo; Celebes.

21. **Ænictus binghami**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 465 & 474, ☿.

☿. Black; the mandibles, antennæ, legs, posterior node of pedicel, base and underside of the abdomen castaneous red. Head, thorax and abdomen covered with scattered erect hairs,

the pilosity of the antennæ and legs a little more dense, the hairs oblique. Head highly polished, smooth and shining, oval, the occipital margin narrow, the occiptal lateral angles much rounded and convex, the lateral yellowish-white spot not so long as in *Æ. martini.* Thorax with the pronotum very convex, delicately transversely sculptured and shining; the metanotum compressed, longitudinally striate, rugose and opaque, the basal portion long, the apical portion nearly vertical laterally, above distinctly margined; legs long and robust, femora and tibiæ as in *Æ. martini.* Pedicel

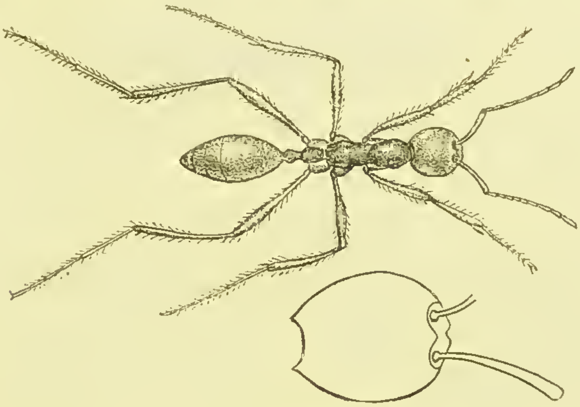


Fig. 17.—*Ænictus binghami*, ☿.

long, the anterior node rugose and opaque, the posterior smooth and shining, seen from the side the nodes are roundly conical and subequal; abdomen broadly oval, constricted at base into a short neck.

Length, ☿ 4–5 mm.

Hab. Assam (*Long*); Burma; Tenasserim (*Fea, Bingham, Hodgson*); probably extending throughout the Malayan subregion, as I have from Borneo specimens indistinguishable from Burmese examples.

22. **Ænictus aitkeni**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 465 & 475, ☿.

☿. Head, thorax and pedicel reddish brown, darkening to deep castaneous brown, almost black on the abdomen; mandibles, antennæ and legs a lighter red-brown; pilosity sparse, confined to a few long erect reddish hairs, slightly more abundant on the antennæ and legs. Head oval, subopaque, delicately rugulose; mandibles broad, armed with distinct teeth on the masticatory margin. Thorax elongate; pronotum not very broad, convex, rugulose and subopaque like the head, but in addition with longitudinally elongate wrinkles, that are continued more abundantly on the posterior portion of the thorax, which latter is more closely sculptured and rugose; metanotum compressed, the emargination at the meso-metanotal suture slight, merely indicated; apical portion of metanotum vertical, separated from the basal portion by a very distinct carina which is remarkably prominent above;

legs long, robust; femora gradually elavate from base to apex, but not as in *Æ. binghami*, *Æ. fergusoni* and others, constricted near the apex. Nodes of pedicel slightly longer than broad, coarsely sculptured and opaque; abdomen highly polished, smooth and

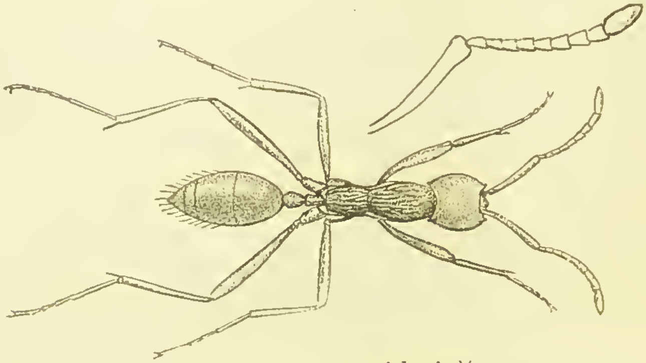


Fig. 18.—*Ænictus aitkeni*, ☿.

shining, except at base where it is delicately rugulose and with a few large shallow punctures.

Length, ☿ 4·5–5·3 mm.

Hab. Western India, Poona (*Wroughton*), Kanara (*Aitken*), Travancore (*Ferguson*).

A very distinct speeies.

23. **Ænictus pachycerus**, *Smith* (Eciton), *Cat.* vi (1858), p. 153, ☿.
Typhlatta bengalensis, *Mayr*, *Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 668, ☿.
Ænictus bengalensis, *Forel*, *Jour. Bomb. N. H. Soc.* xiii (1901), pp. 465 & 476, ☿.

☿. Castaneous red, the mandibles, antennæ and legs very little if at all lighter in eolour. Head, thorax and abdomen with a few scattered ereet hairs; antennæ and legs slightly more pubescent. Head broadly oval, as broad posteriorly as in front, very delicately rugulose, subopaque or only slightly shining in certain lights.

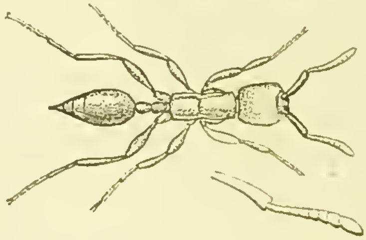


Fig. 19. —*Ænictus pachycerus*, ☿.

Thorax rather broad, anteriorly eonvex, the pronotum delicately rugulose like the head, the emargination at the meso-metanotal suture very shallow and wide; metanotum more densely rugulose, opaque, the colour sensibly darkening on the sides, above broadly rounded, the apical portion steeply oblique, but not vertical,

separated from the basal portion by a distinct carina; legs long and robust, the femora moderately clavate but constricted at apex. Nodes of the pedicel rounded, convex, the 1st node posteriorly more vertical than the 2nd node, both nodes finely and delicately sculptured; abdomen elongate, oval, highly polished, smooth and shining.

Length, ☿ 3–4 mm.

Hab. Dehra-Dun to Travancore and Madras; Kanara; probably throughout continental India.

Smith originally described this species erroneously under the genus *Eciton*, giving as habitat "South America?" with a doubt. The types came out of General Hardwicke's collection and are now in the British Museum. Surprising to say they, as well as several other specimens from the same collection, are now labelled "India," apparently in Smith's own writing. Why and under what misconception Smith, at the time of writing his description, considered the species American it is impossible to say. His error has not, so far as I know, been yet corrected, and I believe it has been copied into several works, *e.g.* Mayr's Reise d. Novara, Formicidæ, p. 76; Forel's 'Formigas do Brazil,' Boletim do Museu Paraense, i, fasc. 2, p. 121; and Dalla Torre's 'Catalogus Hymenopterorum,' vii, p. 8. Comparing specimens of *Ænictus bengalensis*, Mayr, in Mr. Rothney's collection, named, I believe, by Dr. Mayr himself, with the types of *Æ. pachycerus*, Smith, I find that they are identical.

24. **Ænictus brevicornis**, *Mayr* (Typhlatta), *Verh. zool.-bot. Ges. Wien*, xxviii (1878), pp. 668 & 669, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), p. 466, ☿.

☿. Reddish or fulvous yellow, mandibles, antennæ and legs a little paler. Head, thorax, and abdomen with sparse erect rather short pale yellow hairs. Head rectangular, very broad posteriorly, smooth and shining; mandibles with three distinct teeth; antennæ very short and massive, much thicker proportionately than in any other species. Thorax narrower than the head; pronotum convex, smooth and shining; mesonotum posteriorly and metanotum densely but very finely and delicately rugulose; basal portion of the metanotum passing by a gradual curve, uninterrupted by a carina, into the obliquely-sloping apical portion; legs short, rather robust, femora and tibiæ remarkably clavate and swollen. Nodes of pedicel rounded, shining, the anterior node slightly rugulose in front; abdomen elongate, oval, proportionately rather massive.

Length, ☿ 2·5–3 mm.

Hab. India: N.W. Provinces (*Smythies*), Calcutta, Bangalore, Calicut (*Rothney*); Assam (*Long*). The smallest of the Indian species.

25. **Ænictus punensis**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 466 & 476, ☿.

☿. Brownish or yellowish red, the mandibles, antennæ and

legs very little, if at all, paler. Head, thorax and abdomen sparsely, antennæ and legs densely pilose, the hairs oblique. Head smooth, shining, rectangular, longer than broad, the sides very slightly convex; mandibles triangular, with broad toothed masticatory margin; antennæ massive but long, not short as in *Æ. brevicornis.* Thorax anteriorly rounded, smooth and shining, above convex, level, with the usual wide depression at the meso-metanotal suture obsolete; metanotum sculptured, opaque, striate on the sides, passing with a rounded slope uninterrupted by a carina to the apex; legs long, femora clavate. Nodes of pedicel rounded above, punctured, slightly subopaque; abdomen oval, very smooth and shining.

Length, ☿ 3–3·5 mm.

Hab. Western India, Poona (*Wroughton*).

26. **Ænictus peguensis,** *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 452, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), p. 466, ☿.

☿. Closely allied to and resembling *Æ. ceylonicus*, Mayr, but somewhat lighter in colour and slighter in build, the metanotum is less rugosely sculptured, and the nodes of the pedicel are not punctured nor opaque. Head rectangular, very broad posteriorly, smooth and shining. Thorax anteriorly polished and shining; metanotum finely and closely punctured, opaque not striate; legs as in *Æ. ceylonicus*, long, with the femora strongly clavate. Abdomen oval, polished and shining.

Length, ☿ 2–3 mm.

Hab. Burma (*Fea*); Tenasserim (*Bingham*).

27. **Ænictus ceylonicus,** *Mayr* (Typhlatta), *Sitzungsb. Akad. Wiss. Wien,* liii, 1 *Abth.* (1866), p. 505, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1901), pp. 466 & 477, ☿.

☿. Resembles *Æ. punensis*, but is slightly darker in colour on the thorax and lighter on the abdomen. Yellowish or brownish red; pilosity sparse on head, thorax and abdomen, fairly abundant and erect on the antennæ and legs. Head shorter proportionately and wider than in *Æ. punensis*, smooth and shining; mandibles narrow, tridentate; antennæ long and massive. Thorax very broad in front, strongly compressed posteriorly; pronotum smooth and shining, very convex, almost gibbous above, meso-metanotal suture very distinct; metanotum rugosely striate, the basal portion short, the apical portion vertical and separated from the basal portion by a distinct carina above and on the sides; legs long and robust, femora clavate. Nodes of pedicel large, smooth and shining, conical; abdomen oval, smooth, polished, shining, almost translucent.

Length, ☿ 2–3 mm.

Hab. Nearly all continental India and Ceylon.

A variable species; var. *latro*, Forel, differs in having joints 2–4 of the flagellum of the antennæ longer than thick (much thicker than long in typical *Æ. ceylonicus*). Certain specimens from Calcutta have a few longitudinal wrinkles on the pronotum and nodes of the pedicel.

Subfamily PONERINÆ.

The species of this subfamily are characterized primarily by a constriction, sometimes slight, but generally distinct, and often remarkably deep, between the basal two abdominal segments, and by the unmodified, powerful and generally exserted sting. The body is more or less elongate and cylindrical, the abdomen especially so, the mandibles powerful, the antennæ more or less massive: eyes generally present, absent in one or two genera; legs moderately long. Habits predaceous and carnivorous. The *Ponerinæ* carry their prey or food underneath the body between the fore legs, a method of carrying food &c. quite different from that adopted by the *Camponotinæ* and *Myrmecinæ*. The males and females of the *Ponerinæ*, so far as they are known, are always winged.

Key to the Genera.

A. Antennal carinæ not widened anteriorly, not covering base of antennæ.
- *a*. Antennæ 11- or 12-jointed.
  - *a'*. Eyes entirely wanting .... SPHINCTOMYRMEX, [p. 24.
  - *b'*. Eyes present.
    - a^2. Eyes remarkably large, lateral, placed below middle of head .... LIOPONERA, p. 26.
    - b^2. Eyes small, lateral, placed about or above middle of head .... CERAPACHYS, p. 28.
- *b*. Antennæ 9-jointed .... SYSCIA, p. 31.
- *c*. Antennæ 10-jointed .... OOCERÆA, p. 31.

B. Antennal carinæ widened anteriorly, more or less covering base of antennæ.
- *a*. Pedicel not free; a strong constriction, but no flexible joint between pedicel and abdomen.
  - *a'*. Mandibles with a distinct apical margin.. MYOPOPONE, p. 33.
  - *b'*. Mandibles without any distinct apical margin.
    - a^2. Mandibles spatulate at apex .... MYSTRIUM, p. 35.
    - b^2. Mandibles pointed at apex .... STIGMATOMMA, [p. 36.
- *b*. Pedicel free, with a flexible joint between it and the abdomen.
  - *a'*. Mandibles articulated close together in middle of front margin of head.
    - a^2. Antennal hollows confluent posteriorly. ODONTOMACHUS, [p. 46.
    - b^2. Antennal hollows not confluent posteriorly .... ANOCHETUS, p. 38.
  - *b'*. Mandibles articulated, wide apart at lateral angles of front margin of head.
    - a^2. Mandibles long, curved upwards, one strong tooth at base of masticatory margin, thence denticulate to apex.... DREPANOGNATHUS, [p. 49.
    - b^2. Mandibles differently formed.
      - a^3. Claws pectinate.
        - a^4. Mandibles arched, long, narrow, pointed, with no apical margin.... LEPTOGENYS, p. 52.
        - b^4. Mandibles often long and narrow, with a distinct, if oblique apical margin .... LOBOPELTA, p. 54.

b^3. Claws not pectinate.

a^4. Pronotum with teeth or spines .... ODONTOPONERA, [p. 72.

b^4. Pronotum without teeth or spines.

a^5. Posterior margin of clypeus not distinctly defined .... PLATYTHYREA, [p. 73.

a^5. Posterior margin of clypeus defined by a suture.

a^6. Node of pedicel bispinous posteriorly .... DIACAMMA, p. 75.

b^6. Node of pedicel not bispinous, sometimes denticulate posteriorly.

a^7. Posterior coxæ armed with a spine .... ECTATOMMA, p. 82.

b^7. Posterior coxæ unarmed.

a^8. Episternum of mesothorax separated from sternum by a suture. ECTOMOMYRMEX, [p. 85.

b^8. Episternum of mesothorax not separated from sternum.

a^9. Posterior tibiæ with only one spur.

a^{10}. Club of flagellum of antennæ not well defined.......... PONERA, p. 88.

b^{10}. Club of flagellum of antennæ distinct.

a^{11}. Mandibles armed with five teeth .... CRYPTOPONE, [p. 104.

b^{11}. Mandibles armed with two teeth .... MYOPIAS, p. 103.

b^9. Posterior tibiæ with two spurs.

a^{10}. Middle of front margin of clypeus produced, truncate at apex .... PSEUDOPONERA, [p. 91.

b^{10}. Middle of front margin of clypeus not produced. [p. 93.

a^{11}. Without eyes, blind ...... CENTROMYRMEX,

b^{11}. Eyes present.

a^{12}. Meso-metanotal suture obsolete .... BOTHROPONERA, [p. 95.

b^{12}. Meso - metanotal suture well marked.

a^{13}. Masticatory margin of mandibles very long, longer than inner margin. MESOPONERA, [p. 99.

b^{13}. Masticatory margin of mandibles shorter, about length of inner margin.. BRACHYPONERA, [p. 101.

Genus SPHINCTOMYRMEX.

Sphinctomyrmex, *Mayr, Verh. zool.-bot. Ges. Wien*, xvi (1866), p. 895, pl. 20, fig. 8.

Type, *S. ståli*, Mayr, from Brazil.

Range. Neotropical and Indo-Malayan regions.

☿. Of elongate slender form; head rectangular, slightly

emarginate posteriorly; mandibles triangular, with a distinct dentate masticatory margin; clypeus very narrow, transverse, produced backwards in an angle between the antennal carinæ, its anterior margin straight, transverse; antennal carinæ short, close together, convergent posteriorly, not covering the base of the antennæ; antennæ 11- or 12-jointed (11-jointed in the two Indian species), the flagellum clavate; eyes and ocelli entirely absent. Thorax very short, elongately rectangular, as broad posteriorly as in front, flat above, laterally compressed, truncate and transverse posteriorly; pro-meso- and meso-metanotal sutures entirely obliterated above; legs short and stout, femora and tibiæ more or less cylindrical, claws minute, simple. Pedicel one-jointed, node quadrangular; abdomen very long, nearly twice the length of the thorax, cylindrical, constricted at the apical margins of all except the last segment.

Key to the Species.

a. The apical truncate face of the metanotum carinate above and on the sides.............. *S. furcatus*, p. 25.
b. The apical truncate face of the metanotum carinate only on the sides .... *S. taylori*, p. 25.

28. **Sphinctomyrmex furcatus**, *Emery* (Eusphinctus), *Ann. Mus. Civ. Gen.* xxxiv (1894), p. 457, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 328, ☿.

☿. Dark reddish or ferruginous brown, the legs slightly paler, pilosity reddish, fairly abundant and stiff; head, thorax and abdomen with large, coarse, irregularly scattered punctures. Head rectangular, longer than broad, as broad posteriorly as in front; mandibles subtriangular, robust, the masticatory margin obscurely dentate, the base above striate; clypeus transverse, very narrow, raised in the middle and extending back between the antennal carinæ, which are very short, prominent and close together, curving anteriorly outwards along the posterior margin of the clypeus; antennæ very thick and short; occiput slightly and widely emarginate. Thorax elongate, rectangular, compressed, the sides parallel, the apex obliquely truncate and carinate around the margin of its posterior face. Pedicel and abdomen with the characters as given in the genus, the last segment flat above, bifurcate at apex.

Length, ☿ 6·5–7 mm.

Hab. Recorded from Lower Burma (*Fea*).

29. **Sphinctomyrmex taylori**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 328, ☿.

☿. Closely resembles *S. furcatus*, Emery, but is smaller, and the pygidium is not so deeply bifurcate. Brownish yellow, covered

with partly erect, short pale hairs; pubescence almost entirely absent. Head, thorax, node of the pedicel above and basal abdominal segment somewhat coarsely punctured, most densely on the head and basal abdominal segment, and very sparsely on the thorax above, which is smooth and shining. Head longer than broad, emarginate posteriorly; mandibles densely punctured; antennal hollows margined on the outside by an arcuate carina; antennæ very massive and thick. Thorax with the basal face of the metanotum passing into the apical face by an abrupt curve, the latter margined only at the sides, not above. Node of the pedicel about as broad as long, slightly rounded at the corners, convex above; abdomen: the 2nd and succeeding segments with fine, rather scattered punctures; pygidium concave, incised at apex, and with the lateral margins spinulose.

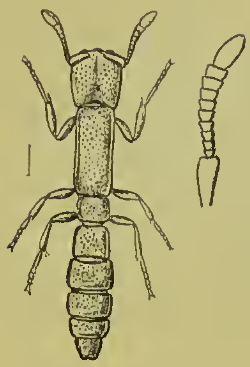


Fig. 20.—*Sphincto-myrmex taylori*, ☿.

Length, ☿ 5–5·5 mm.

Hab. Bengal (*Taylor*).

Genus **LIOPONERA**.

Lioponera, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 666.

Type, *L. longitarsus*, Mayr, from India, Bengal.

Range. India and Sumatra, probably the whole Indo-Malayan region.

☿. Head ovato-rectangular; mandibles triangular, comparatively large, masticatory margin broad, obsoletely dentate: clypeus very narrow, transverse; antennal carinæ short, prominent, very close together; antennæ 12-jointed, scape and flagellum both incrassate towards the apex; eyes round, proportionately very large, placed forward on the sides of the head close to the base of the mandibles; head posteriorly transverse. Thorax short, rectangular, transverse in front, truncate posteriorly, the sides flat; the pro-meso- and meso-metanotal sutures obsolete; legs stout, elongate, the tarsi especially so; the femora and tibiæ cylindrical. Pedicel one-jointed, with the node nearly square, very slightly convex above, broader than long, truncate and slightly concave in front, transverse posteriorly; abdomen comparatively long, longer than the thorax, the constriction between the basal two segments very deep.

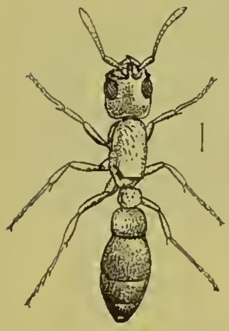


Fig. 21.—*Lioponera longitarsus*, ☿.

♀ a little larger, but almost exactly similar to the ☿; head comparatively a little broader. Basal joint of the posterior tarsi very long, as long as the tibiæ. Ocelli present.

♂. Resembles the ☿. Mandibles triangular, broad. Eyes comparatively small, scape of the antennæ comparatively long. Antennal carinæ as in the ☿, small frontal carinæ between the eyes and the antennal hollows. Head more or less square and somewhat rounded, slightly constricted posteriorly. Pronotum extending a little on the upper side of the thorax to the mesonotum, with no converging furrows. The basal portion of the metanotum bordered by a carina as in the ☿. Node of the pedicel roundly cubical. First segment of the abdomen extremely narrow and deeply constricted, giving even more than in the ☿ the appearance of forming a second node to the pedicel.

Key to the Species.

a. Length 4 mm.; head half as long again as broad .... *L. longitarsus*, p. 27.

b. Length under 3 mm.; head twice as long as broad .... *L. parva*, p. 27.

30. **Lioponera longitarsus**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 667, ☿ ♀; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 329, ♂ ♀.

☿. Head and abdomen black, shining; antennæ, mandibles, thorax, pedicel and legs red. Head, thorax and abdomen above with scattered minute punctures and sparse, very short, erect black hairs. Antennæ with the subapical joint of the flagellum longer than broad, the apical joint more than twice as long as broad. For the rest the characters of the genus.

♀. Similar to the ☿, larger. Colour as in the ☿.

♂. The characters of the genus. Colour as in the ☿. Wings subhyaline, nervures very pale, stigma brown. Pygidium without point. Hypopygium with a narrow, deep, angular emargination.

Length, ☿ 4; ♀ 4; ♂ 3·5 mm.

Hab. Bengal (*Rothney*); Western India, Poona to Travancore (*Wroughton*).

31. **Lioponera parva**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 330, ☿ ♂.

☿. Closely resembles *L. longitarsus*, but is smaller, with a proportionately longer and narrower head, the apical three joints of the flagellum of the antennæ proportionately thicker, and the basal segment of the abdomen larger. Head, thorax and basal abdominal segment brownish red; rest of abdomen blackish; mandibles, antennæ and legs testaceous.

♂. Similar to the ☿ in colour, smooth and shining.

Length, ☿ 2·5; ♂ 2·5–3 mm.

Hab. Dehra Dun (*Smythies*); Bengal (*Rothney*); Madras; Western India (*Wroughton*).

Genus CERAPACHYS.

Cerapachys, *Smith, Jour. Linn. Soc.* ii, 1857, p. 74, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 54, ☿.

Type, *C. antennatus*, Smith, from Borneo.

Range. Ethiopian and Indo-Malayan regions.

☿. Elongate, narrow. Head oval, occiput emarginate, mandibles triangular, narrow at base, the masticatory margin broad, obsoletely dentate; antenual carinæ elongate, curving round the base of the antennæ, but not broadened into a lamina over the same; antennal hollow very wide, bounded exteriorly by a strong carina; clypeus very narrow and transverse; antennæ 11- or 12-jointed, stout, the basal joints of the flagellum very short, the apical joint long, thickened, and pointed at apex; eyes small, lateral, placed closer to the posterior than to the anterior margin of the head. Thorax rather short, slightly compressed, the pro-meso- and meso-metanotal sutures not distinct; pronotum anteriorly rounded, metanotum truncate at apex; legs moderately long and stout, the tibiæ with a single pectinate calcar at apex. Pedicel one-jointed, node separate, both from the metanotum and abdomen, more or less roundly cubical; abdomen elongate, the basal segment not truncate anteriorly, the constriction between the basal two segments deep and well-marked.

Nothing is known about the habits of the species, but the deep constriction between the basal two abdominal segments reminds one of the species of the Fossorial genus *Apterogyna*.

Key to the Species.

a. Antennæ 11-jointed .... *C. fossulatus*, p. 28.
b. Antennæ 12-jointed.
  a'. Head, thorax, and abdomen black.
    *a*². Apical joint of flagellum of antennæ distinctly much longer than preceding three joints .... *C. risii*, p. 29.
    *b*². Apical joint of flagellum of antennæ equal to or only very little longer than preceding three joints................ *C. sulcinodis*, p. 30.
  b'. Head in part, thorax, pedicel and basal joint of abdomen red .... *C. aitkeni*, p. 30.

32. **Cerapachys fossulatus**, *Forel, Ann. Soc. Ent. Belg.* (1895), p. 48; *id. Jour. Bomb. N. H. Soc.* xiii (1900), p. 331.

☿. Deep brownish or yellowish red, the head in part and the abdomen, excluding the basal segment, black. The whole insect polished and shining; the head, thorax and basal abdominal segment coarsely punctured, cribrate, the rest of the abdomen more finely and sparsely punctured; the whole insect covered with fairly abundant, long, erect whitish hairs, and a fine sericeous, rather sparse, hoary pubescence, seen only in certain lights, and especially dense on the antennæ and legs. Head strongly convex, the emargination posteriorly deep, the posterior

lateral angles acute, the antennæ remarkably clavate and swollen towards the apex. Thorax slightly arched and rounded above, the posterior face of the metanotum smooth, bordered by a semicircular carina; legs with the femora and tibiæ incrassate, the femora slightly compressed, the tibiæ cylindrical. Pedicel cubical, rounded above, as wide as the basal abdominal segment; abdomen elongate, the 2nd segment wide and long, very convex above; the constriction between the basal two segments very broad and deep, giving the appearance to this species of having a 2-jointed pedicel.

Length, ☿ 5–7 mm.

Hab. Ceylon (*Yerbury*); Burma, Pegu Yoma (*Allan*).

33. **Cerapachys risii**, *Forel, in Grandidier's Hist. Madagasc.* xx, 1892, p. 244 (footnote), ☿; *id. Jour. Bomb. N. H. Soc.* xiii (1900), p. 331, ☿.

☿. Black and shining; the mandibles, antennæ and legs brownish or reddish yellow, the head and thorax sparsely but coarsely punctured, the pedicel more densely punctured and longitudinally coarsely furrowed or wrinkled; the whole insect covered rather abundantly with fine long erect yellowish hairs, most dense towards the apex of the abdomen. Head convex in front, slightly narrower posteriorly than in front, the posterior lateral angles acute; the mandibles, clypeus, and antennal carinæ more reddish in colour than the legs. Thorax strongly rounded and convex above, submargined anteriorly; the posterior face of the metanotum flat, bordered above and on the sides by a shining

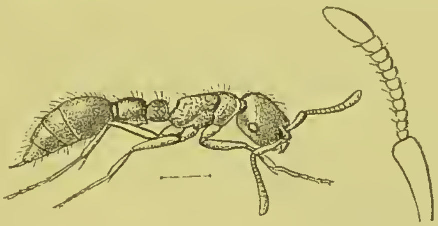


Fig. 22.—*Cerapachys risii*, ☿.

carina; legs with the femora and tibiæ cylindrical, rather densely pubescent. Node of the pedicel longer than broad, convex above, sub-concave in front and rounded posteriorly; abdomen elongate, the constriction between the basal two segments broad and well-marked; basal segment much broader posteriorly than in front, where it is transverse and submargined, posteriorly the constricted apical portion is smooth and shining, divided off by a deeply impressed transverse line; 2nd segment broader than the 1st, remaining segments gradually narrower; apex of the abdomen acute.

Length, ☿ 5·5–6·5 mm.

Hab. India, Sikhim (*Bingham*); Burma (*Fea*), extending to the Malay Peninsula.

34. **Cerapachys sulcinodis**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 493, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 331, ☿.

☿. Closely resembles *C. risii*, Forel, but is larger, the mandibles are striate (only punctate in *C. risii*), the proportion of the joints of the flagellum of the antennæ is different, and the apex of the same is not so incrassate as in *C. risii*. Black, the mandibles and antennæ fuscous; the legs and extreme apex of the abdomen reddish yellow; the whole insect covered with soft short, sparsely scattered, erect white hairs. Head anteriorly sparsely, posteriorly cribrately punctured. Thorax rounded above, submargined anteriorly; the basal portion of the metanotum separated from the obliquely truncate apical portion by a fine shining carina, not so marked and distinct above as in *C. risii*; legs, pedicel, and abdomen as in *C. risii*.

Length, ☿ 7–7·5 mm.

Hab. Burma, Karennee, 5000 ft. (*Fea*); Maymyo, 3000 ft. (*Smythies*).

35. **Cerapachys aitkeni**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 331 & 332, ☿ & ♂.

☿. Resembles *C. fossulatus*, Forel, but is smaller, and the difference in the number of joints of the flagellum of the antennæ separates it at once. Head and second and following segments of the abdomen black; mandibles, antennæ, clypeus, antennal hollows and carinæ, thorax, legs, pedicel and basal segment of the abdomen dark red. The head also is sometimes partially, sometimes entirely, red or reddish. Head, thorax and abdomen covered with a thick, short, erect yellowish pilosity, more dense than in any other species, but not hiding the sculpture in any way. Head very closely and somewhat irregularly cribrate and subopaque; thorax and node of pedicel with sparsely scattered shallow punctures; abdomen almost smooth and shining. Head as broad posteriorly as in front, the posterior emargination deep, the posterior lateral angle very acute. Thorax convex and arched above, anteriorly submargined, posteriorly the basal portion of the metanotum is separated from the apical portion by a semicircular carina; legs short and stout, with the femora and tibiæ cylindrical. Node of the pedicel and abdomen as in *C. fossulatus*.

♂. "Mandibles shining, triangular, with the masticatory margin rather long, slightly concave. Antennæ with 13 joints, but resembling the antennæ of the ☿. . . . Eyes of moderate size. Head, antennal carinæ, &c. as in the ☿. Mesonotum slightly convex and slightly overhanging the pronotum, without converging furrows. The oblique portion of the metanotum truncate, margined by a carina as in the ☿. Pedicel also as in the ☿. First abdominal segment, properly speaking, constricted and narrow, and like that of the worker appearing as if it were a 2nd node to the pedicel. Pygidium rounded. Hypopygium deeply emarginate, terminating in two long spines, one on each side,

slender from their base and widely separated one from the other, very shining; sculpture resembling that of the ☿, but with deep instead of shallow dimple-like punctures. Abdomen sparsely punctured. Pilosity similar to that of the ☿. Wings rather short, hyaline, with the nervures brown, a large deeper brown marginal spot, and one cubital cell. Generative organs hidden. Entirely black; flagellum of the antennæ, mandibles and tarsi brownish. Basal joint of the flagellum and posterior margins of the abdominal segments reddish." (*Forel.*)

Length, ☿ 4·5; ♂ 4·6–5 mm.

Hab. Western India, Kanara (*Wroughton*).

Genus SYSCIA.

Syscia, *Roger, Berl. ent. Zeit.* v (1861), p. 19.

Type, *S. typhla*, Roger, from Ceylon.

Hab. Ceylon, Australia.

☿. Head rectangular, longer than broad, destitute of eyes or ocelli, transverse posteriorly; mandibles narrow, subtriangular, the apical tooth on the masticatory margin long, acute and curved; clypeus narrow, transverse, almost obsolete; antennal carinæ short, prominent, not close together; antennæ 9-jointed, short, stout, flagellum clavate, apical joint very massive, long and oval. Thorax a little broader anteriorly than posteriorly, slightly laterally compressed, truncate, slightly concave posteriorly; legs comparatively robust, the femora and tibiæ cylindrical; claws bifurcate. Pedicel one-jointed; node cubical, toothed beneath, inserted in the middle of the basal abdominal segment, which anteriorly is truncate and subemarginate; rest of the abdomen ovate, the constriction between the basal two segments very broad and deep.

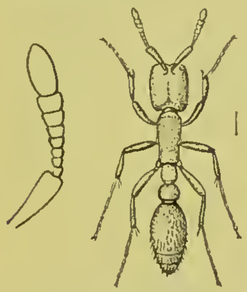


Fig. 23.
Syscia typhla, ☿.

36. **Syscia typhla**, *Roger, Berl. ent. Zeit.* v (1861), p. 20, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 329.

☿. Brownish red; mandibles, antennæ and legs testaceous red. Head, thorax and abdomen shining, fairly closely but very finely punctured, covered with fairly abundant, short, erect, reddish hair. For the rest, the characters of the genus.

Length, ☿ 2·75 mm.

Hab. Ceylon.

Genus OOCERÆA.

Ooceræa, *Roger, Berl. ent. Zeit.* vi (1862), p. 248.

Type, *O. fragosa*, Roger, from Ceylon.

Range. Recorded so far from Ceylon only.

"☿. Head rectangular, with the angles somewhat rounded and the posterior border emarginate; anteriorly the margin is lightly rounded. The clypeus narrow, its upper and posterior margins sharply arched; it surrounds the antennal hollows, and connects the base of the antennæ from one side to the other with a fine carina. Eyes placed in the middle of the sides of the head. A single ocellus in the middle of the front. The antennæ are placed very near the front margin of the head, springing out of a narrow, sharp-edged groove; they are 10-jointed; scape short, about as long as the flagellum without the apical joint; at the base they are slender, thickening towards the apex. The first joint of the flagellum is somewhat longer than the others (excluding apical joint); these are very close to one another and are broader than long, increasing in thickness towards the apex. The apical joint is very large, elongate, ovate, and as long as the rest of the joints united. The mandibles are about one-quarter the length of the head; they are triangular, and their masticatory margin is long but not dentate.

"The thorax is nearly as long as the head with almost parallel sides, a little constricted anteriorly, without trace of transverse sutures, posteriorly sharply truncate. This abrupt truncation (the truncate face of the metanotum) is lightly concave with a sharp border, and on the upper margin nearly triangular.

"The pedicel is indistinct and carries two thick nodes; the two together are somewhat shorter and narrower than the thorax. The 1st node is thick, nearly quadrate, but rounded all over; posteriorly more, anteriorly less steeply sloped and connected to the thorax by a slender petiole. Anteriorly near the base, situated on either side, is a small tooth, on the underside towards the front a larger one. The 2nd node is equally thick, quadrate, rounded, and from the side appears larger than the 1st, as on the underside it surpasses the other. Both nodes are equally broad. The abdomen is long, oval, moderately flat, the 1st segment being distinctly the largest.

"The legs are short. Femora and tibiæ moderately broad, all the latter appear to end in a pectinate spine. Claws simple." (*Roger.*)

37. **Ooceræa fragosa**, *Roger, Berl. ent. Zeit.* vi (1862), p. 249.

"☿. Dark reddish ferruginous; the antennæ, mandibles and legs much the same, but a little lighter; the anterior margin of the head and the base of the abdomen clear bright ferruginous. The whole body, together with the antennæ and legs, moderately clothed with short, obliquely-erect, yellowish hairs. The head and thorax thickly covered with large punctures which are often, on the latter particularly, rugose and confluent. The nodes are more feebly, the abdomen still more finely punctured." (*Roger.*)

Length, ☿ 2·8 mm.

Hab. Ceylon. Unknown to me.

Genus MYOPOPONE.

Amblyopone, *Smith* (*nec Erichs.*), *Jour. Linn. Soc.* v (1860), p. 105, pl. i, fig. 6, ☿.
Myopopone, *Roger*, *Berl. ent. Zeit.* v (1861), p. 49, ☿.

Type, *M. castanea* (var. *maculata*), Smith, from Ceylon.

Range. Indo-Malayan region.

☿. Head broad, very thick and massive, convex below and above; mandibles porrect, linear, as broad at apex as at base, the apex with three teeth, the inner margin with a single row of stout teeth; clypeus narrow, transverse, overhung by the broad laminate portion of the antennal carinæ, which cover the base of the antennæ. Antennæ 12-jointed, short, thick, flattened and incrassate towards the apex of the flagellum; eyes minute, lateral, placed rather high up on the sides of the head, the distance between the eyes and the base of the mandibles being greater than between the eyes and the top of the head. Thorax flattish above, laterally compressed, the sides, at least of the metanotum, more or less vertical, the pro-meso- and meso-metanotal sutures deeply marked and approximate; the mesonotum narrow but distinct; the metanotum obliquely truncate at apex, the basal portion passing into the apical portion by an acute curve, the apical face flat, submargined at the sides; legs moderately long and stout, the femora compressed, the tibiæ cylindrical, posterior pair with two calcaria. Pedicel one-jointed, large, on a level with the abdomen, anteriorly truncate and slightly concave, posteriorly joined to the abdomen by the whole of its posterior face; abdomen cylindrical, tapering gradually to the apex, the constriction between the basal two segments well marked; sting long, exserted.

♀. Similar to the ☿, the thorax and abdomen more massive. In the former the pronotum is short with the lateral angles rounded, the mesonotum broad and flat, longer than the pronotum, scutellum not gibbous, postscutellum narrow, transverse; median segment short, truncate posteriorly, the sides passing by an acute bend into the apical face; legs, pedicel, and abdomen as in the ☿. Wings hyaline, slightly fulvo-fuscous.

Habits and nests of the two recorded species of this genus unknown. The species of the genera *Myopopone*, *Mystrium*, *Amblyopone*, and *Stigmatomma* in form seem allied to the *Thynnidæ* and *Scoliidæ* of the Fossorial Hymenoptera.

Key to the Species.

a. Entirely castaneous red . . . . *M. castanea*, p. 33.
b. Black, with the tibiæ and tarsi and a portion of the apex of the abdomen ferruginous . . . . *M. moelleri*, p. 34.

38. **Myopopone castanea**, *Smith* (Amblyopone), *Jour. Linn. Soc.* v (1860), p. 105, pl. i, fig. 6, ☿; *Forel*, *Jour. Bomb. N. H. Soc.* xiii (1900), p. 54, ☿ ♀.
Myopopone maculata et rufula, *Roger*, *Berl. ent. Zeit.* v (1861), pp. 50, 51 & 52, ☿ & ♀ & ♂.

☿. Entirely castaneous red, shining, rather sparsely and closely punctured, the punctures most dense on the metanotum and pedicel, and very scattered and indistinct on the abdomen. Pilosity long, fairly dense, yellowish red in colour, longest and thickest towards the apex of the abdomen. Head without the mandibles nearly square, the posterior lateral angles rounded, almost subtruncate; mandibles punctured, the tips crossed, leaving a large triangular space between them and the margin of the clypeus; antennal carinæ ending in a bulging laminate plate covering the base of the antennæ; these laminæ, the lower part of the face on either side of them, and the posterior lateral margins of the head coarsely striate. Thorax: the pronotum broader than long, rounded in front, transverse posteriorly; mesonotum transverse, meso-metanotal suture crenulate; basal horizontal portion

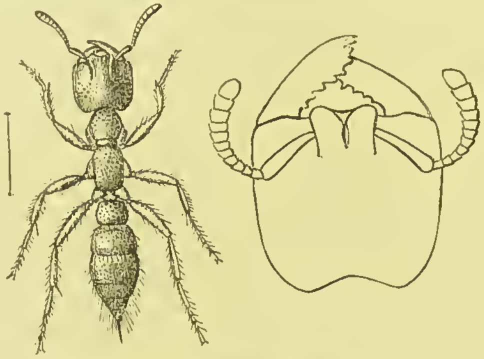


Fig. 24.—*Myopopone castanea*, ☿.

of metanotum only slightly longer than the obliquely sloping apical portion, the latter finely transversely striate; legs more or less densely pubescent, especially the tarsi, which are thickly clothed with rather long golden-red hair. Pedicel above nearly square, slightly broader than long; abdomen with the 1st and 2nd segments subequal in length, but the latter broader than the former, and both broader than they are long.

♀. "Occiput longitudinally striate, the pronotum level, with the mesonotum forming part of the back. The mesonotum anteriorly with two convergent and posteriorly with a single medial furrow, as in the males of certain species. Wings shaded with reddish brown. The rest as in the ☿." (*Forel.*)

Length, ☿ 9–11 mm. (including mandibles): mandibles 2 mm. ♀ 14 mm.

Hab. The Indo-Malayan region, and within our limits this ant has been recorded from Ceylon (apud *Roger*), the Nicobars (*Roger*), Burma and Tenasserim (*Bingham*).

39. **Myopopone moelleri**, sp. nov.

♀. Jet-black and shining, the mandibles, the antennæ, and the apex of the laminæ of the antennal carinæ dark reddish brown; the

apex of the femora, the tibiæ and tarsi of the legs, and the apical segment of the abdomen a lighter yellowish brown. Pilosity and pubescence as in *M. castanea*, but of a darker colour. Head as in that species and with similar sculpture, but the punctures on the mandibles run into longitudinal striæ, the apex of the mandible is more oblique, and the apical tooth is long, acute, and slightly curved. Thorax and abdomen as in ♀ of *M. castanea*, but highly polished and smooth, bearing only a few scattered punctures. Wings fusco-hyaline, costal nervure and stigma black.

Length, ♀ 16 mm. (including mandibles); mandibles 2·5 mm.

Hab. Sikhim.

I took this species at light at 7000 feet, but did not get the ☿.

Genus **MYSTRIUM**.

Mystrium, *Roger, Berl. ent. Zeit.* vi (1862), p. 245, pl. 1, fig. 15.

Type, *M. mysticum*, Roger, from Madagascar.

Range. Ethiopian and Indo-Malayan regions.

☿. Head much broader than the thorax, square, depressed, very slightly convex above, posteriorly emarginate, the anterior lateral angles produced into acute points on the outer side of each mandible, the posterior lateral angles also acute but not so narrowly produced as the anterior angles; mandibles long, linear, very slightly curved, spatulate at apex, the inner margins dentate; when closed the apices cross in front; clypeus transverse, broader in the middle than at the sides, arched anteriorly, with the margin denticulate; antennal carinæ short, widely separate; antennæ 12-jointed, with the flagellum slightly clavate at the apex; eyes and ocelli entirely wanting. Thorax rounded in front, vertically truncate posteriorly, the pro-mesonotal suture anteriorly arched, broad and distinct, the meso-metanotal suture traceable but not well-marked above; the meso- and metanotum slightly compressed, narrower than the pronotum; legs short and robust. Pedicel one-jointed, with the node cubical, large, truncate anteriorly, posteriorly joined to the abdomen by the whole of its posterior face; abdomen oval, somewhat acutely pointed at apex, the constriction between the basal two segments distinct but not deep.

♀. Closely resembles the ☿; larger. Head a little broader than long; eyes and ocelli present; antennæ, clypeus and mandibles as in the ☿. Thorax broader, deeper, more massive than in the ☿; the pronotum and mesonotum subequal, the latter posteriorly with the scutellum somewhat narrowed; metanotum short, vertically truncate posteriorly. Pedicel and abdomen more massive, but similar to those in the ☿.

Only one species has so far been recorded from within our limits.

40. **Mystrium camillæ**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 491, ☿ ♀, pl. 10, figs. 1-3.

☿. Reddish yellow; the whole insect, even on the mandibles, antennæ and legs, very closely and somewhat coarsely punctured, rugose and granulate; pilosity very short, rather sparse, in no way hiding the sculpture; head slightly wider in front than posteriorly, the sides straight from the base of the mandibles for about two-thirds of their length, then a little bent inwards towards the posterior lateral angles; mandibles slightly twisted, above longitudinally grooved. For the rest, the characters as in the genus.

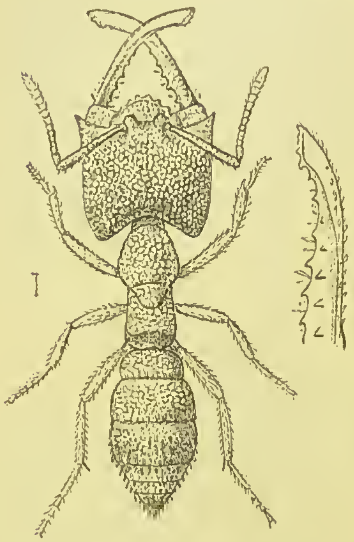


Fig. 25.—*Mystrium camillæ*, ☿.

♀. Closely resembles the ☿; larger and more massive; sculpture of the head and thorax, colour and pilosity as in the ☿, the apical margin of the 1st, 3rd and 4th abdominal segments above smooth, slightly shining. For the rest, the characters as given for the genus.

Length, ☿ 3·3–4·5; ♀ nearly 7 mm.

Hab. Recorded only from Upper Burma (*Fea*).

Genus **STIGMATOMMA**.

Stigmatomma, *Roger, Berl. ent. Zeit.* iii (1859), p. 250, ☿.
Amblyopone, *Forel* (*nec Erichs.*), *Jour. Bomb. N. H. Soc.* xiii (1901), pp. 52 & 55, ☿.

Type, *S. denticulatum*, Roger, from Europe.

Range. Both hemispheres.

☿. Head without the mandibles rectangular; thorax and abdomen more or less cylindrical in form; mandibles elongate, narrow, pointed and slightly curved at apex, armed on the inner side with a double row of acute teeth; eyes moderate or minute, placed at the sides on the upper half of the head; antennæ 12-jointed, filiform, the apex only slightly incrassate. Thorax narrower than the head, the pro-mesonotal suture well marked, the thorax strongly constricted at this point and divided into two almost equal halves; meso-metanotal suture not distinct; metanotum obliquely truncate posteriorly, the basal portion passing into the apical portion by a more or less rounded curve, the apical face of the metanotum broadened, the sides submargined; legs short, robust, the tibiæ of the posterior legs with two calcaria. Pedicel one-jointed, cubical, attached to the abdomen by the whole of its

posterior face; abdomen narrow, not wider than the thorax, the constriction between the basal two segments deep, giving the basal segment a nodiform appearance; sting exserted.

This genus is closely allied to *Amblyopone*, Erichs., but differs chiefly in the shape and armature of the mandibles. Next to nothing is known of the habits of the species, of which three are found within our limits. The nest is subterranean, and the ♀ and ♂ are winged.

Key to the Species.

a. Eyes comparatively large; flagellum of antennæ long, nearly half as long again as mandibles .... *S. rothneyi*, p. 37.
b. Eyes smaller; flagellum of antennæ shorter, about equal in length to mandibles.
  a'. Posterior lateral angles of head prominent. Length under 7 mm. .... *S. feæ*, p. 38.
  b'. Posterior lateral angles of head not prominent. Length over 7 mm. .... *S. belli*, p. 38.

41. **Stigmatomma rothneyi**, *Forel* (Amblyopone), *Jour. Bomb. N. H. Soc.* xiii (1900), pp. 55 & 56, ☿.

☿. Black, the mandibles, the antennæ and antennal carinæ, the legs, and, obscurely, the apices of the abdominal segments, ferruginous. Head, thorax and abdomen finely and densely punctured, covered with short erect pale hairs, somewhat more dense and longer on the femora and tibiæ of the legs; head and thorax opaque, abdomen slightly shining. Head moderately convex above and on the sides, almost as broad posteriorly as in front, the posterior

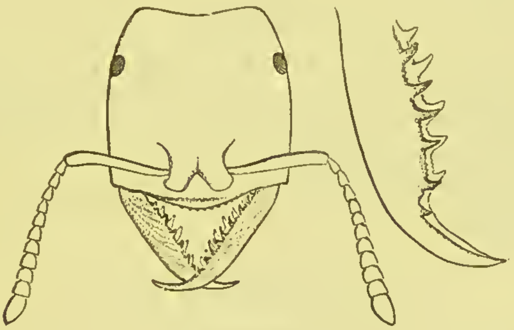


Fig. 26.—*Stigmatomma rothneyi*, ☿.

lateral angles rounded; mandibles obliquely striate, the apex smooth and polished, anterior margin of clypeus transverse, not denticulate; antennal carinæ short, wide apart; joints of the flagellum of the antennæ rounded, distinct. Thorax: the pronotum long, convex above; the mesonotum depressed; the metanotum about as long as the pronotum, rounded above and broadening

posteriorly; legs short, femora and tibiæ cylindrical. Pedicel truncate, almost concave anteriorly, rounded and convex above and on the sides; abdomen about as long as the thorax and slightly broader, the 2nd segment distinctly longer than the 1st.

Length, ☿ 8·5–9 mm. (including the mandibles); mandibles 1·5 mm.

Hab. India, Sikhim (*Möller*); Bengal (*Rothney*).

42. **Stigmatomma belli**, *Forel* (Amblyopone), *Jour. Bomb. N. H. Soc.* xiii (1900), p. 55, ☿.

☿. Closely resembles *S. rothneyi*, but is more elongate in shape and somewhat more coarsely and closely punctured. Black; the mandibles, antennæ, antennal carinæ, and legs ferruginous, darker than in *S. rothneyi*; pubescence similar but darker. Head distinctly narrower posteriorly than in front, mandibles longer than in *S. rothneyi*, obliquely striate, with the apex smooth and polished, anterior margin of clypeus transverse and minutely denticulate; antennæ shorter and thicker than in *S. rothneyi*; antennal carinæ short and wide apart. Thorax and legs similar to those in *S. rothneyi*. Pedicel distinctly longer and subapically slightly constricted; abdomen similar but comparatively narrower.

Length, ☿ 9 mm. (including the mandibles); mandibles 2 mm.

Hab. Western India, Kanara (*Bell*).

43. **Stigmatomma feæ**, *Emery*, *Ann. Mus. Civ. Gen.* xxxiv (1894), p. 454, ☿; *Forel* (Amblyopone), *Jour. Bomb. N. H. Soc.* xiii (1900), pp. 55 & 56, ☿.

"☿. Obscurely fuscous, with a covering of short hairs; head coarsely reticulate and thorax densely punctate and opaque; abdomen slightly punctured, shining, anterior angles of the head prominent, the frontal line very lightly impressed; clypeus striate, anteriorly with a transverse impression and armed with minute teeth; mandibles deeply striate and armed with a double row of curved teeth; eyes rather large; flagellum of the antennæ incrassate, thickening towards the apex.

"*Length*, including mandibles, 6–6·5 mm.

"*Hab.* Burma, Karennee, and the Shan plateau 1400–1500 metres." (*Forel.*)

Unknown to me.

Genus ANOCHETUS.

Myrmecia, pt., *Fabr. Syst. Piez.* 1804, p. 423, ☿.
Odontomachus, pt., *Smith, Jour. Linn. Soc.* vi (1861), p. 44, pl. fig. 4, ☿.
Anochetus, *Mayr, Europ. Formicid.* 1861, p. 53, ☿.

Type, *A. ghilliani*, Spin., from Europe, Spain.

Range. Both hemispheres.

☿. Head like that of *Odontomachus*, somewhat irregularly rectangular; mandibles placed very close together in the middle of the

front of the head and not laterally at the anterior angles, elongate, parallel, the apex bent suddenly at right angles, and with two or three teeth; clypeus very narrow, almost obsolete at the sides, medially triangular, produced backwards in a point between the antennal carinæ; antennal carinæ short, laminate, comparatively wide apart, covering the base of the antennæ; antennal hollows large, but not confluent posteriorly as in *Odontomachus*; antennæ 12-jointed, filiform; head posteriorly emarginate, the posterior lateral angles prominent, the sides straight down to the level of the eyes, then convergent; eyes of moderate size, prominent. Thorax broad and convex in front, rounded and slightly compressed posteriorly; the pronotum constricted into a neck anteriorly, the metanotum more or less truncate posteriorly; legs moderately long, femora and tibiæ cylindrical, claws simple. Pedicel one-jointed, the node moderately thick, on a level with the metanotum, unarmed *; abdomen elongate oval, the constriction between the basal two segments distinct.

♀. Very similar to the ☿, the ocelli small, the mesonotum short with lateral posteriorly convergent carinæ. Wings subhyaline, with a radial and two complete cubital cells.

♂. Mandibles rudimentary, not dentate; antennæ very long, filiform, the scape short, shorter than the 2nd joint of the flagellum, which latter is more than four times as long as the 1st joint; ocelli and eyes very large. Thorax with the mesonotum very convex, rising well above the depressed pronotum; the scutellum large, gibbous, very prominent, almost conical; legs slender; wings as in the ♀; node of the pedicel more flat, but more or less as in the ☿; abdomen massive, the constriction between the basal two segments fairly distinct.

Key to the Species.

A. Mandible with three apical teeth.
- a. Metanotum bidentate.
  - *a.* Antennal hollows thickly punctured ...... *A. longifossatus*, [p. 40.
  - *b.* Antennal hollows smooth and polished .... *A. myops*, p. 40.
- b. Metanotum not bidentate.
  - *a.* Basal abdominal segment closely punctured, opaque.
    - *a'*. Punctures on head and thorax running into longitudinal striæ. Length 4·5–6 mm. *A. rudis*, p. 41.
    - *b'*. Punctures on head and thorax more distinct, not running into longitudinal striæ. Smaller, length 3·5 mm. ...... *A. punctiventris*, [p. 41.
  - *b.* Basal abdominal segment smooth or only very lightly punctured, shining, not opaque at base.
    - *a'*. Pro- meso- and metanotum punctate, not striate .... *A. yerburyi*, p. 42.

* In one species only surmounted by an obtuse spine.

b'. Pro- meso- and metanotum striate.
a^2. Thickness from front to back of node of pedicel at base equal to its height .. *A. sedilloti*, p. 42.
b^2. Thickness from front to back of node of pedicel at base much less than its height.
a^3. Scape of antennæ extending up to posterior lateral angle of head .... *A. taylori*, p. 43.
b^3. Scape of antennæ not reaching up to posterior lateral angle of head .... *A. madaraszi*, [p. 43.
c. Basal abdominal segment finely striate .... *A. kanariensis*, [p. 44.
B. Mandible with two apical teeth.
a. Node of pedicel surmounted by an obtuse spine .... *A. nietneri*, p. 44.
b. Node of pedicel not surmounted by a spine . *A. princeps*, p. 45.

44. **Anochetus longifossatus**, *Mayr, Termes. Füzetek*, xx (1897), p. 425; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 59.

☿. Deep reddish yellow, antennæ and legs a clearer brighter yellow, abdomen brownish; head, thorax, and abdomen for the most part smooth, shining, and highly polished, the front of the head above the base of the antennæ covered with fine close longitudinal divergent striæ, the head anteriorly, the cheeks, a broad space round the eyes, the sides of the head, the posterior lateral lobes and occiput being entirely without striæ or punctures; thorax vaguely punctured, the mesonotum above somewhat transversely rugose; pilosity yellowish, sparse, more dense on the abdomen posteriorly; pubescence comparatively dense on the head and antennæ, sparse on the rest of the body. Head rectangular, somewhat widely and deeply emarginate posteriorly; mandibles highly polished, smooth and shining, the shafts broadening anteriorly, the inner margin above the apical teeth denticulate; the divergent lateral hollows on the front are long, somewhat longer comparatively than in any other species. Thorax rounded in front, the mesonotum broader than long, the basal portion of the metanotum rectangular, somewhat flat, with two short subtriangular erect teeth obtuse at the apex. Node of pedicel cuneiform, subdentate above; abdomen long, cylindrical.

Length 4·5–5 mm.

Hab. Ceylon.

45. **Anochetus myops**, *Emery, Rev. Suisse, Zool.* i (1893), p. 201, pl. viii, figs. 11 & 12, ☿.

☿. Brownish yellow, shining, the disc of the 1st and 2nd abdominal segments brown. Head very broad and short, very widely emarginate posteriorly, the front striate, the rest of the head minutely but sparsely punctured; mandibles short, the shaft broadening towards the apex, and furnished with three rather long acute teeth; clypeus small, emarginate in the middle anteriorly; antennal carinæ somewhat wide apart, curved inwards; eyes very small. Thorax shining, punctured; the metanotum

oblique, truncate at apex, the sides produced and rounded, obtuse. Node of the pedicel as high as the metanotum, smooth and shining, conical, rounded above; abdomen highly polished, smooth and shining.

Length, ☿ 4·5 mm.

Hab. Lower Burma, Palon near Rangoon (*Fea*); Pegu Yoma (*Bingham*).

I am not quite certain whether I have identified this species correctly; the one specimen that I procured has not got the disc of the pro- and mesonotum smooth, but in other particulars, especially in the smallness of the eyes and in colour, it agrees fairly well with Dr. Emery's description of his *A. myops* from Burma.

46. **Anochetus rudis**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 499, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 60, ☿.

☿. Resembles *A. punctiventris*, Mayr, but is considerably larger and more stoutly built. Dark brown, the mandibles, antennæ, and the whole head, except in the hollows, the legs and the apical margin of the basal abdominal segment reddish castaneous. Head, thorax and abdomen densely pilose and pubescent; the head, thorax, node of the pedicel and base of the 1st abdominal segment densely punctured, rugose and opaque; on the head and the thorax anteriorly in certain lights the punctures seem to run into longitudinal striæ; the rest of the abdomen and the legs polished, smooth and shining. Head with a very narrow median space posteriorly, smooth in some specimens; thorax with the posterior apical obliquely truncate face of the metanotum submargined and coarsely transversely striate.

Length, ☿ 4·5–6 mm.

Hab. Burma, Mandalay (*Fea*); Ceylon, Kandy (*Bingham*).

I am not quite sure whether I have identified this species correctly. Specimens I have from Ceylon agree fairly well with Dr. Emery's very brief description.

47. **Anochetus punctiventris**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 659, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii, pp. 59 & 63 (1900).

☿. Brownish ferruginous, the abdomen conspicuously darker, the mandibles and legs lighter in colour. Head, thorax, and abdomen with a few scattered pale hairs, erect on the head and thorax, depressed and oblique on the abdomen; pubescence absent. Head posteriorly not so deeply emarginate as in some of the other species, convex in front, closely and regularly punctured, the punctures finer and more sparse on the mandibles and scape of the antennæ; the preapical inner margin of the mandibles minutely serrate. Thorax densely punctured, obliquely truncate posteriorly, the apical face of the metanotum conspicuously margined at the sides. Node of the pedicel ovate, rounded above, smooth; abdomen stout, the basal segment densely punctate in front.

"♀. Thorax wide. Pronotum as long as the mesonotum, both shining and abundantly punctured. The mesonotum has two lateral carinæ converging posteriorly. Scutellum smooth and shining. Metanotum strongly transversely striate. Node of the pedicel emarginate above." (*Forel.*)

Length, ☿ 3·5; ♀ 4 mm.

Hab. Bengal, Sikhim (*Rothney & Möller*); Western and Southern India (*Wroughton*).

48. **Anochetus yerburyi**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 59 & 62, ☿.

☿. Closely resembles *A. punctiventris*, Mayr, but is slightly larger and the sculpture is much feebler and less pronounced. Head, with the mandibles and antennæ, and the legs testaceous yellow, the thorax and abdomen light shining castaneous red. Head smooth with, on the front, a fan-shaped area finely, very faintly, longitudinally striate. Thorax somewhat coarsely longitudinally rugose in front, the meso- and metanotum transversely striate. Node of the pedicel flat, squamiform, only slightly convex in front above, the margin is subacute and rounded; abdomen smooth and shining, with the base punctured.

Length, ☿ 4–4·5 mm.

Hab. Ceylon (*Green*).

49. **Anochetus sedilloti**, *Emery, Ann. Mus. Civ. Gen.* xxi (1884), pp. 377 & 378, fig. ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 59, ☿.

☿. Head with the mandibles and antennæ, thorax and legs more or less light reddish brown, abdomen dark brown. In some the mandibles and antennæ are lighter in colour than the head. Head smooth except for a few delicate longitudinal striæ on and between the antennal carinæ; mandibles tridentate at apex, the intermediate tooth very small. Thorax very finely and delicately striate, the striæ transverse on the collar and on the meso- and metanotum, and longitudinal on the disc of the pronotum. Node of the pedicel thick and conical, more convex in front than posteriorly, raised, higher or as high as the metanotum; abdomen smooth, polished and shining.

♀. "Ocelli very small. Pronotum longer than the mesonotum. This latter small, nearly level, margined by two posteriorly convergent carinæ. Metanotum subcubical, transversely striate. Pronotum partly striate and partly punctate; mesonotum opaque, irregularly punctate. Wings hyaline. For the rest as in the ☿." (*Forel.*)

♂. "Very similar to the ♂ of *A. madaraszi*, but the mesonotum wants the converging furrows. Pedicel somewhat higher. Genital valves larger. Of a brownish black, the abdomen posteriorly brown. Legs and antennæ testaceous. The wings smooth and hyaline; nervures and stigma rather pale." (*Forel.*)

Length, ☿ 6–6·5; ♀ 7; ♂ 4·5–5 mm.

Hab. Western India (*Wroughton*); Northern Africa, Tunis.

The above is the description of the Indian form, var. *indicus*, Forel, which differs very little from the true *A. sedilloti*, Emery, described originally from Tunis in North Africa. The latter is smaller, slightly darker, and with the sculpture, especially of the head, somewhat more pronounced.

50. **Anochetus taylori**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 60 & 63, ☿.

☿. Dark castaneous brown, shining, the mandibles, antennæ, region round the eye and legs ochraceous, the posterior lateral angles and margins of the head, the node of the pedicel and the constricted band between the basal two segments of the abdomen rather lighter brown or brownish yellow. Head, thorax and abdomen with scattered erect pale hairs. Head longitudinally finely striate in front, the striæ divergent posteriorly, the posterior lateral angles very highly polished, smooth and shining. Thorax densely punctured, the punctures running into longitudinal striæ on the pronotum and into transverse striæ on the rest of the thorax; the apical face of the metanotum margined on the sides. Node of the pedicel and abdomen smooth and shining, the former thick, convex in front, flat, almost concave posteriorly.

Length, ☿ 4·5–5·3 mm.

Hab. Western India, Poona, Belgaum, and the Nilgiris (*Wroughton*).

51. **Anochetus madaraszi**, *Mayr, Termesz. Füzetek*, xx (1897), p. 424, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 59 & 61, ☿ ♂.

☿. Castaneous brown, shining; the mandibles, antennal carinæ, antennæ, the elevations in front of and posterior to the eye, the posterior lateral angles of the head, and the legs pale shining

Fig. 27.—*Anochetus madaraszi*, ☿. *a.* Head; *b.* Mandible; *c.* Pedicel.

yellow. Pilosity and pubescence almost entirely wanting. Head without the mandibles nearly square, a little broader across from eye to eye than across the posterior lateral angles; front very

finely longitudinally striate, the striæ spreading out in a fan-shape, divergent posteriorly, rest of the head smooth and polished. Thorax: the pronotum convex, broad, with concentrically arched striæ, the constricted neck in front, the meso- and metanotum with fine transverse striæ; metanotum unarmed, the apex obliquely truncate; legs smooth and shining. Node of pedicel viewed from the back oval, flat, rounded above; abdomen rather massive; node of the pedicel and abdomen highly polished, smooth and shining.

♂. Dark reddish brown, the mandibles, antennæ, legs, and abdomen from the 3rd segment to the apex testaceous; wings lacteous, nervures and stigma pale testaceous. Head, thorax and abdomen shining, covered with short, fairly abundant dark pubescence. Head with the eyes and ocelli very large and prominent. Thorax with the mesonotum and scutellum gibbous, very convex and prominent, punctured, the convergent furrows on the mesonotum not distinct; metanotum short, broad, truncate posteriorly; node of the pedicel thick, not raised to the level of the metanotum; abdomen massive, finely punctured.

Length, ☿ 5·5–6; ♂ 4 mm.

Hab. Bengal (*Rothney*); Western India (*Wroughton*); Ceylon (*Green & Wickwar*).

52. **Anochetus kanariensis**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 59 & 62, ☿.

☿. The posterior three-fourths of the head and the abdomen dark brown, almost black, the remainder of the head and the thorax bright rufous; mandibles, antennæ and legs pale yellow. Head, thorax and abdomen covered with somewhat sparse, short, erect whitish hairs, and a fine thin sericeous white pubescence, dense on the antennæ, and obsolete, almost absent, on the abdomen. Head tolerably coarsely, regularly longitudinally striate; the sides below the eyes and the antennal hollows smooth, highly polished and shining; mandibles minutely punctured and shining, the apical teeth remarkably long and acute, rather slender. Thorax densely but finely rugulose, opaque. Node of the pedicel thick, convex in front, concave posteriorly, above almost flat, and viewed from above crescentic, somewhat coarsely rugose; basal abdominal segment very finely transversely striate, the striæ in concentric arches from back to front, remainder of abdomen finely punctured, shining.

Length, ☿ 7 mm.

Hab. Western India, Kanara (*Wroughton*); Madras (*Rothney*).

Dr. Forel regards this as a race only of *A. orientalis*, André, from Cochin China.

53. **Anochetus nietneri**, *Roger* (Odontomachus), *Berl. ent. Zeit.* v. (1861), p. 23, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 59, ☿.

"☿. Shining ferruginous, with bright yellow legs and mandibles;

the thorax and the apical margin of the mandibles are darker. Head, thorax and legs with sparse, the abdomen with abundant erect hairs. The head is much broader than the thorax and the abdomen; it is broadest in the middle, in the front much, posteriorly less narrowed; the lateral margins in front, as well as behind the eyes, waved, and the posterior margin truncate with projecting rounded angles. The eyes placed in the middle of the sides of the head. The antennal carinæ are arched and bounded by the inner margins of the antennal hollows, these are deep in front, flattening out posteriorly. The clypeus in front is abruptly truncate. The antennæ are slender, not very long. The mandibles are at the base smaller and nearer together than at the apex, which is bent at right angles and split into two large teeth on the masticatory margin; before the middle is a small, and after the middle, nearer the apex, a much larger tooth. The head is entirely smooth and shining, and only the space between the antennal hollows is longitudinally striate. The prothorax is much broader than the rest of the thorax, rounded somewhat suddenly, constricted anteriorly into a small neck, smooth and shining. The rest of the thorax above is transversely striate or rugose, on the sides smooth and shining. The node of the pedicel is conical, with a somewhat obtuse spine above, and on the underside a small tooth in front. The pedicel is inserted wholly under the anterior face of the abdomen. This latter is oval, about as broad as the prothorax; its 1st segment is broader than long, anteriorly somewhat smaller, and is plainly truncate behind and above the rounded front face. The tibiæ are tolerably broad, and the claw-bearing or apical joint of the tarsi is the longest; the claws are simple." (*Roger.*)

Length, ☿ 6·5 mm.

Hab. Ceylon (*Nietner*).

54. **Anochetus princeps**, *Emery, Ann. Mus. Civ. Gen.* xxi (1884), p. 379, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 59, ☿.

"☿. Ferruginous, shining, with erect hairs, but no pubescence; head posteriorly deeply emarginate, broadened anteriorly, the front striate, the rest smooth, the clypeus in front deeply excavate; mandibles smooth, the internal margin denticulate, the apex with two large obtuse teeth, the intermediate tooth obsolete, merged into the apical tooth. Thorax: the pro- and mesonotum shining, with scattered, partially obsolete, piligerous tubercles; scutellum transversely raised; metanotum transversely rugose; the pedicel with an elevated node unarmed." (*Emery.*)

Length, ☿ 7·5–8 mm.

Hab. Procured by Signor Fea in Tenasserim, extending to Java.

Genus ODONTOMACHUS.

Formica, pt., *Linn. Syst. Nat.* ed. 10, i (1758), p. 582, ☿.
Odontomachus, *Latr. Nouv. Dict. Hist. Nat.* xxiv (1804), p. 179.
Myrmecia, pt., *Fabr. Syst. Piez.* 1804, p. 423, ☿.

Type, *O. hæmatodes*, Linn., from the tropics of both hemispheres.

Range. Both hemispheres.

☿. Elongate. Head very large and massive in proportion to the thorax and abdomen, rectangular, longer than broad, in all the Indian species more or less emarginate posteriorly; mandibles articulated close together in the middle of the anterior margin of the head and not at the lateral angles, long, linear and straight to near the apex, which is abruptly bent inwards at almost a right angle, and terminates in three massive teeth, the innermost one broad and truncate, the apical one unequal, obtusely rounded or subtruncate at apex; the inner margins of the shaft of the mandibles more or less distinctly denticulate; antennal hollows large, spreading upwards and confluent posteriorly; antennæ 12-jointed, slender, filiform; eyes comparatively small but prominent, placed laterally on the lower half of the head; the posterior lateral angles of the head prominent. Thorax much narrower than the head, elongate, rounded above, more or less depressed and emarginate at the meso-metanotal suture; legs long and slender. Pedicel one-jointed, surmounted by a conical node terminating in a spine above; abdomen comparatively small, oval, very convex above; the constriction between the basal two segments not very strongly marked; the sting exserted.

♀. Similar, larger; the mesonotum square, somewhat flat, a deep transverse depression between it and the scutellum, the latter convex, prominent; the metanotum rounded and arched gradually from base to apex. Wings hyaline, with a brownish tinge; nervures and stigma brown.

The species belonging to this genus are eminently forest ants, never, so far as I know, found near human habitations. They nest under stones and fallen trees, and on being disturbed or alarmed leap about in a remarkable manner. Notwithstanding their formidable-looking jaws, they seem to be afraid of most other species. I have seen a single ☿ of the fierce *Œcophylla smaragdina* put to flight a whole nest of *Odontomachus monticola*. The remarkable jumps or leaps taken by ants of this species have been accurately recorded by Mr. Wroughton from a note received from Mr. Ferguson of Travancore. Mr. Ferguson says:—"I got some of those (ants) which you said were supposed to jump. I don't think they do, but they can shoot themselves backwards by bending their heads, pressing their mandibles against any firm support, and then bringing them together with a click. I tried them several times, and found that if held by a prelimb, they always released themselves in this way, using the imprisoned limb as a fulcrum for the mandibles to work against." (Jour. Bomb. N. H. Soc. vii. (1892) p. 51.)

Key to the Species.

a. The whole head very finely and delicately striate and having a beautiful silky gloss . *O. hæmatodes*, p. 47.
b. The upper part of the head smooth or punctate, not striate, no silky gloss.
  a'. The inmost of the three apical teeth on the mandible rather narrow, twice as long as broad . . . . *O. rixosus*, p. 48.
  b'. The inmost of the three apical teeth on the mandible broad, as broad as long.
    a². Head posteriorly only slightly emarginate, in no sense bilobed . . . . *O. monticola*, p. 48.
    b². Head posteriorly deeply emarginate, bilobed . . . . *O. punctulatus*, p. 49.

55. **Odontomachus hæmatodes**, *Linn.* (Formica) *Syst. Nat. ed.* 10, i (1758), p. 582, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 57, ☿.

☿. Dark castaneous brown, with a fine delicately minute pubescence, giving it a rich silky gloss. Head, thorax and the node of the pedicel anteriorly very delicately and finely striate; abdomen smooth and shining, the posterior margins of the segments testaceous. Pilosity very sparse, consisting of a few scattered erect hairs. Head rather broad, posteriorly almost as broad as in front from eye to eye; the denticulation on the inner margin of the mandibles almost obsolete, the innermost of the apical teeth broad but very short; the striæ on the front divergent posteriorly, the emarginate occiput smooth and polished, not striate, a narrow impressed line or furrow medially down the front of the head to the confluence of the antennal hollows, the face below slightly raised and also with a short impressed longitudinal line; antennal carinæ short and broad, strongly convergent above. Thorax very little longer than the head without the mandibles, compressed; the pronotum constricted anteriorly into a neck, posteriorly round, above convex, the striæ concentric; metanotum truncate posteriorly, the striæ transverse and somewhat coarser; legs with the femora and tibiæ cylindrical. Node of the pedicel convex in front, flat posteriorly, spine on the top slightly attenuate at base, distinct from the node; abdomen with a few scattered piligerous punctures and a sparse short recumbent pubescence.

♀. Very similar, with similar sculpture, larger; the ocelli entirely wanting; the abdomen more massive.

Length, ☿ 9–11; ♀ 11–12 mm., without the mandibles; mandibles 2·5 mm.

Hab. Sikhim (*Möller*); Assam (*Long*); Madras, Cochin (*Rothney*); Travancore (*Ferguson*); Ceylon (*Yerbury*, *Green*); not recorded from Burma; found, however, in Africa and in America also.

56. **Odontomachus rixosus**, *Smith, Jour. Linn. Soc.* ii (1857), p. 64, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 58, ☿.

☿. Similar to *O. hæmatodes*, Linn., but smaller; more slender and lighter in colour. Pale castaneous brown, the legs testaceous yellow. Pilosity almost entirely wanting, confined to a few long erect hairs on the front of the head and apex of the abdomen. Pubescence very sparse, not giving the insect the silky gloss possessed by *O. hæmatodes*. Head contracted posteriorly, distinctly narrower than in front; the striæ entirely effaced on the posterior portions of the head; on the front, above the antennal carinæ, they are divergent posteriorly, spreading out fan-shaped; denticulations on the inner margins of the mandibles coarser and more distinct than in *O. hæmatodes*. Thorax more feebly, but similarly striate and sculptured; legs similar, the tibiæ extremely attenuate at base. Node of the pedicel more convex anteriorly, smooth, not striate; the terminating spine above thick at base, its sides continuous with the sides of the cone-shaped node; abdomen proportionately shorter, smooth and shining.

Length, ☿ 10–11·5 mm.

Hab. Assam (*Smythies*); Burma (*Fea, Bingham*); extending to Sumatra and Java.

The variety from Burma is a little darker than the typical form from Sumatra and Java, and has been separated as var. *obscurior* by Dr. Forel.

57. **Odontomachus monticola**, *Emery, Ann. Soc. Ent. Fr.* lx (1891), p. 560, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 57, ☿.

☿. Dark castaneous or reddish brown; the mandibles, antennæ and legs reddish yellow. Pilosity almost wanting, pubescence very sparse and short. Head broader in front from eye to eye than posteriorly, the side hollows deep and well marked; mandibles robust, the apical teeth large, the inmost one broad as long, broadly truncate: the inner margins of the mandibles with 7 or 8 small but distinct teeth; the antennal hollows deep, the front between and above them with rather coarser striæ than in *O. rixosus*, Smith, divergent, spread out in fan-shape; the sides of the head shining, sparsely punctured, the upper half smooth and shining, the striæ almost effaced, the medial groove or impressed line shallow, the emarginate occiput smooth. Thorax with concentric striæ on the pronotum, the mesonotum and metanotum transversely striate; legs with fine dense short pubescence; the femora and tibiæ cylindrical. Node of the pedicel smooth, slightly compressed, very convex in front, the spine at the apex above thick at base; abdomen larger than in any other Indian species, smooth and shining, rounded and strongly convex above.

Length, ☿ 11–13 mm.

Hab. Assam, the Gáro hills (*Long*); Burma (*Bingham*); Ka-

rennee (*Fea*); and the Shan States (*Thompson*), extending into Siam.

Var. *longi*, Forel, is similar, but with much finer, feebler striæ almost or quite effaced on the pronotum.

58. **Odontomachus punctulatus**, *Forel, Jour. Bomb. N. H. Soc.* xii (1900), p. 58, ☿.

☿. Closely resembles the preceding species, but can be distinguished at once by its deeply emarginate occiput, making the head appear almost bilobed; the medial longitudinal groove on the front of the head well marked; the inmost of the apical teeth on

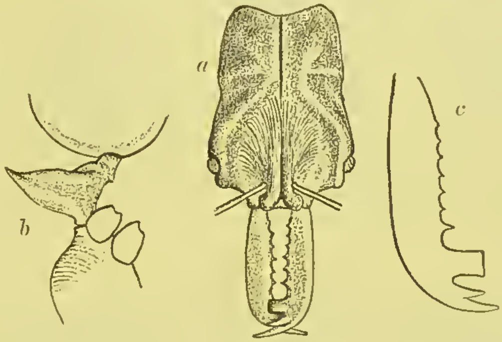


Fig. 28.—*Odontomachus punctulatus*, ☿.
a. Head; *b*. Pedicel; *c*. Mandible.

the mandible comparatively longer and broader than in *O. monticola*, and the inner margin of the shaft of the mandible with only 3 or 4 small teeth. Thorax: the sculpture coarser and deeper than in *O. monticola*.

Length, ☿ 12-13·5 mm.

Hab. Sikhim (*Möller*); Assam (*Smythies*); Upper Burma, Bhamo (*Bingham*).

Genus DREPANOGNATHUS.

Harpegnathus, *Jerdon* (*nec Wesm.* 1834), *Madr. Jour. Lit. & Sci.* xvii (1851), p. 116, ☿.
Drepanognathus, *Smith, Cat.* vi (1858), p. 81, pl. v.

Type, *D. saltator*, Jerdon, from Malabar.

Range. India, Burma, Ceylon, China.

☿. Head rectangular, emarginate posteriorly; mandibles articulated at the sides of the head, and more than half as long again as the head, sickle-shaped, curved upwards, serrated on the inner side, the saw-like teeth or serrations terminating, at a distance of about four-fifths of the whole length of the mandibles from the apex, in a large triangular laminate tooth; clypeus triangular; antennal carinæ stout, somewhat close together, broadly laminate

and covering the bases of the antennæ; these latter 12-jointed, slender, filiform; eyes remarkably large and prominent, their lower orbits reaching right down to the base of the mandibles. Thorax elongate, depressed and slightly laterally compressed, the pro-mesonotal suture remarkably broad and shallow, crenulate posteriorly; meso-metanotal suture obsolete above; posterior face of the metanotum truncate, slightly concave; legs long and slender. Pedicel one-jointed, cylindrical, narrowed anteriorly, vertically truncate posteriorly; abdomen cylindrical, the constriction between the basal two segments very distinct; sting exserted, powerful.

♀. Very similar to the ☿, slightly larger; pro- and mesonotum subequal.

♂. "Wings with two or three closed cubital, two discoidal, and a radial cell. Mandibles somewhat rudimentary. Antennæ long, filiform, with the 1st joint of the flagellum short, about as broad as long. Clypeus broad, trapeziform. Frontal area very large, triangular. The antennæ are inserted behind the frontal area, at the sides of the antennal carinæ, which are very short, close together, and placed entirely behind the frontal area. Mesonotum with two strong convergent furrows. Maxillary palpi with at least 5 joints. Pygidium terminated in a long and acute point." (*Forel.*)

There are only two species of this genus known, both found within our limits. Like *Odontomachus*, *Drepanognathus* when startled and disturbed makes the most astonishing leaps, but, so far as my observations go, the species of neither of the two genera, unless disturbed or startled, leap as a mode of locomotion.

Key to the Species.

a. Head, thorax and abdomen not concolorous .... *D. saltator*, p. 50.
b. Head, thorax and abdomen concolorous .... *D. venator*, p. 51.

59. **Drepanognathus saltator**, *Jerdon* (Harpegnathus), *Madr. Jour. Lit. & Sci.* xvii (1851), p. 117, ☿.
Drepanognathus cruentatus, *Smith, Cat.* vi (1858), p. 82, ☿.
Harpegnathus saltator *et* cruentatus, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 63 & 65, ☿ ♀ ♂.

☿. Head. thorax and pedicel ferruginous red, closely and rather coarsely punctured, granulate; abdomen black, shining, not granulate, with punctures finer and more scattered; mandibles, antennæ and legs yellow; the whole insect covered with short, sparse, erect pale hairs, and a minute, fine, sericeous shining pubescence on the mandibles, head, antennæ, thorax and legs, visible only in certain lights. For the rest the characters of the genus.

♀. Similar to the ☿; the ocelli placed very low down, almost in the middle of the front of the head.

♂. "Mandibles short, triangular, rather wide, but not elongate. Head somewhat longer than broad, strongly constricted behind the eyes and up to the occipital articulation. Concavity in front

shorter and broader than in *D. venator*. Posterior face of the metanotum strongly margined. First abdominal segment pyriform elongate as in *D. venator*. No constriction between the basal two segments. A small median carina behind the occiput. Smooth and shining. Metanotum, pedicel and a part of the sides of the

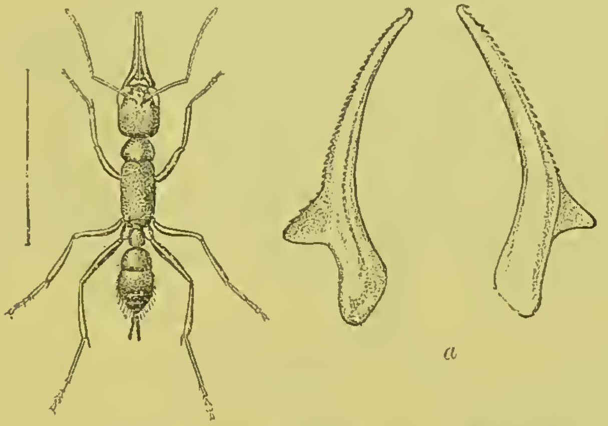


Fig. 29.—*Drepanognathus saltator*, ☿. *a*. Mandibles.

mesonotum coarsely rugose. Some foveæ or obsolete striæ on the rest of the thorax. Pilosity as in *D. venator*. Reddish brown, the pedicel darker. Abdomen brown. Legs and antennæ pale testaceous. Wings hyaline, nervures and stigma very pale." (*Forel.*)

Length, ☿ 14–17; ♀ 17; ♂ 9·5 mm.

Hab. Western India, Mysore, Kanara (*Wroughton*), Travancore (*Ferguson*); Ceylon (*Green*); China? (*Smith*).

60. **Drepanognathus venator**, *Smith, Cat.* vi (1858), p. 82, ☿; *Forel*, (Harpegnathus) *Jour. Bomb. N. H. Soc.* xiii (1900), pp. 63 & 64, ☿♀♂.

☿. Black; mandibles, clypeus, antennal carinæ and legs brownish yellow, antennæ castaneous, apex of the abdomen ferruginous; head and thorax closely coarsely cribrate punctate; abdomen finely densely reticulate punctate, opaque, with some large shallow punctures. Head, thorax and abdomen covered with rather sparse, short, erect pale hairs; pubescence minute but fairly plentiful, to be seen only in certain lights. For the rest the characters of the genus.

♀. Similar to the ☿, but the abdomen with long oblong punctures, the ocelli in the middle of the front. Thorax and abdomen more massive and as in *D. saltator*.

♂. "Mandibles broad at the base, attenuate, narrow and slender towards the apex, which is directed forwards. Head rectangular, somewhat rounded, broader than long. Eyes rather smaller

than in the ♀. A short depression between the mesonotum and scutellum, bordered by carinæ and strongly striate inside. Smooth and shining, save the thorax, which is coarsely rugose, punctate or striate (longitudinally on the metanotum). Covered by a fine yellowish pilosity, dense on the legs, less abundant elsewhere. Pubescence very sparse. The 1st abdominal segment is pyriform and has the appearance of forming a 2nd node to the pedicel, a slight constriction between the 2nd and 3rd segments. Thorax and pedicel of a brownish black, head and basal segment of the abdomen reddish yellow. Rest of the abdomen yellow with a tinge of red. Legs and antennæ very pale testaceous."

Length, ☿ 16–18; ♀ 18–20; ♂ 10 mm.

Hab. Northern India, Dehra Dun (*Smythies*); Sikhim (*Möller*); Assam (*Smythies*); Burma, Maymyo, 3000 ft. (*Bingham*); Madras? (*Smith*).

Dr. Forel records (*l. c.*) a mimetic spider, *Salticus plataloides*, Cambr., being found with this ant.

Genus LEPTOGENYS.

Ponera, pt., *Smith, Cat.* vi (1858), p. 83, ☿ ♂.
Leptogenys, *Roger, Berl. ent. Zeit.* v (1861), p. 41, ☿.

Type, *L. falcigera*, Roger, from Ceylon.

Range. Ethiopian, Indo-Malayan, and Australian regions in the Eastern, and the Neotropical region in the Western hemisphere.

☿. Head quadrangular, about as broad as long, broader in front than posteriorly, very convex; mandibles remarkably long, slender and curved, acute at apex, not dentate; clypeus very narrow, produced anteriorly in the middle; antennal carinæ small and laminate, very short and very close together; antennæ 12-jointed, placed low down immediately above the clypeus, long, filiform, and rather thick; eyes comparatively large, a little anterior, closer to the base of the mandibles than to the posterior lateral angles of the head. Thorax narrower than the head, the pronotum moderately convex, anteriorly constricted into a collar, pro-mesonotal suture well marked, meso-metanotal suture somewhat obsolete above; thorax level above, not emarginate, obliquely truncate posteriorly; legs long and very robust, the femora and tibiæ cylindrical, claws pectinate. Pedicel one-jointed, node cubical; abdomen elongate, cylindrical, the constriction between the basal two segments well marked; sting long, exserted.

Nothing is known concerning the habits of the two species of this genus found within our limits.

Key to the Species.

a. Head, thorax and abdomen very finely punctured, not pruinose	*L. falcigera*, p. 53.
b. Head, thorax and abdomen not punctured, densely pruinose	*L. pruinosa*, p. 53.

61. **Leptogenys falcigera**, *Roger, Berl. ent. Zeit.* v (1861), p. 41, ☿.

☿. Black, the mandibles, antennæ and legs castaneous red, the apex of the abdomen ferruginous, the head anteriorly and the apex of the abdomen with a few scattered ferruginous hairs; pubescence almost wanting, only in certain lights a microscopic silvery pile can be observed, most dense along the margins of the prothorax. Head: the mandibles smooth, almost cylindrical, the apices crossing in front, clypeus bordered anteriorly by a very narrow testaceous membrane, and armed with an acute tooth on each side close to the base of the mandibles; scape of the antennæ remarkably stout, reaching beyond the top of the head, 2nd joint of the flagellum longer than the 1st or 3rd. Thorax more closely and coarsely punctured than the head or abdomen; legs smooth. Node of pedicel rounded above, truncate anteriorly and posteriorly, and broader than long; abdomen longer than the thorax, the 2nd segment longer than the 1st and with a broad, shallow, but plainly visible transverse sub-basal groove.

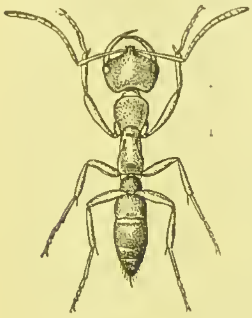


Fig. 30.
Leptogenys falcigera, ☿.

Length, ☿ 7·5 mm., including the mandibles; mandibles 2 mm.
Hab. Ceylon (*Yerbury & Green*); Madagascar (after *Forel*).

62. **Leptogenys pruinosa**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 304.

☿. Very closely resembles *L. falcigera*, but the head, thorax and abdomen are not punctured, but covered with a dense hoary pruinosity, giving the insect a greyish sandy appearance. Black, the mandibles castaneous red, the apex of the tibiæ, the tarsi and apical segment of the abdomen dull ferruginous yellow. The mandibles are slightly shorter and less curved than in *L. falcigera*; the produced medial portion of the clypeus is more broadly rounded at the apex, and the testaceous membrane bordering its anterior margin is broader; the node of the pedicel is narrower in front than posteriorly, and distinctly longer than in *L. falcigera*, being as long as broad or longer. Abdomen: the 2nd segment without the broad transverse groove, the extreme bases of the segments when drawn out highly polished and shining.

Length, ☿ 6·5–7·5 mm., including the mandibles; mandibles barely 2 mm.
Hab. Ceylon, Kandy (*Bingham*).

Genus LOBOPELTA.

Ponera, pt., *Smith. Jour. Linn. Soc.* ii (1857), p. 67, ☿ ; *Roger, Berl. ent. Zeit.* v (1861), p. 15, ☿.
Lobopelta, *Mayr, Verh. zool.-bot. Ges. Wien,* xii (1862), p. 733, ☿.

Type, *L. diminuta*, Smith, from the Indo-Malayan region.

Range. Ethiopian, Indo-Malayan and Australian regions in the Eastern, and the Neotropical region in the Western hemisphere.

☿. Allied to and closely resembling the genus *Leptogenys*, Roger. Head variable, in some species elongate-oval, in others more or less rectangular, but generally (at least in the Indian species) longer than broad; mandibles long and linear, but less cylindrical than in *Leptogenys*, and always with a distinct and generally toothed masticatory margin at apex; clypeus narrow, transverse, more decidedly triangularly produced in the middle, in most of the species conspicuously vertically carinate; antennal carinæ and antennæ as in *Leptogenys*; eyes as a rule placed slightly higher up and more to the front, on the sides of the head. Thorax similar, but with the meso-metanotal suture more distinctly marked; legs proportionately more slender, claws pectinate. Pedicel one-jointed, node variable, squamiform or cubical; abdomen as in *Leptogenys*.

Fig. 31.—*Lobopelta*, showing pectinate claws.

♂. Resembles the ☿, but the head is smaller, subtriangular; the mandibles conspicuously short and pointed at apex; thorax more massive, the pronotum depressed, the mesonotum and scutellum raised, the former with a Y-shaped impressed crenulate mark, the latter separated from the mesonotum by a short, broad, transverse furrow; postscutellum and metanotum depressed, the latter convex above. Pedicel one-jointed, the node conical, thick at base; abdomen similar to that of the ☿, the pygidium entire, the hypopygium broadly emarginate at apex, cerci distinct. Wings with three cubital and one discoidal cell, the 3rd cubital long and reaching to the margin of the wing. ♀. Unknown.

The species of *Lobopelta* are credited with the ability to make stridulatory sounds audible to the human ear. Wroughton (Jour. Bomb. N. H. Soc. vii (1892), p. 27) records the following observation of Mr. Aitkin's:—"The roar raised by a squadron of *Lobopelta*, if you poke at them with a straw, does not require to be listened for with your hand to your ear." I have experimented with and watched several species in nature, but personally I was unable to hear any sound made by them. *L. chinensis*, *L. birmana*, and *L. kitteli* seem always to march in columns of four; while *L. binghami* and *L. aspera* I have only seen in single or double file, and very often singly, wandering about foraging, like *Diacamma*. I can confirm Mr. Wroughton's observations as to the termitophagous habits of this genus.

Key to the Species.

A. Node of pedicel squamiform, compressed longitudinally, its upper margin narrow, obtuse.

- *a.* Clypeus not dentate.
  - *a'.* Medial joints of flagellum of antennæ distinctly longer than broad .... *L. ocellifera*, p. 57.
  - *b'.* Medial joints of flagellum of antennæ not longer than broad .... *L. birmana*, p. 58.
- *b.* Clypeus tridentate anteriorly .... *L. dentilobis*, p. 58.

B. Node of pedicel not compressed longitudinally, broader above, sub-cubical with anterior and posterior margins.

- *a.* Antennæ remarkably thick; joints of flagellum 3–6 much broader than long .... *L. crassicornis*, p. 59.
- *b.* Antennæ not remarkably thick; joints of flagellum all longer than broad.
  - *a'.* Head more or less striate.
    - a^2. Basal abdominal segment coarsely rugose, the punctures longitudinally foveate .... *L. aspera*, p. 60.
    - b^2. Basal abdominal segment polished, shining.
      - a^3. Clypeus not carinate.
        - a^4. Node of pedicel low, not higher than metanotum, broader than long .... *L. kitteli*, p. 60.
        - b^4. Node of pedicel higher than metanotum, only about as broad as long .... *L. altisquamis*, p. 61.
      - b^3. Clypeus more or less distinctly carinate or subcarinate.
        - a^4. Colour yellowish or reddish brown. *L. wood-masoni*, p. 62.
        - b^4. Colour black.
          - a^5. Head strongly constricted posteriorly, distinctly narrower across the occiput than in front .... *L. hodgsoni*, p. 62.
          - b^5. Head not constricted posteriorly, as broad across the occiput as in front.
            - a^6. Striæ on head close, irregular, and broken. Length 5–5·5 mm. .... *L. striatula*, p. 63.
            - b^6. Striæ on head regular, not broken, often not very distinct and wanting on upper part of head. Length over 6 mm.
              - a^7. Clypeus acutely carinate down the middle ...... *L. diminuta*, p. 61.
              - b^7. Clypeus barely subcarinate. In some specimens carina entirely wanting ...... *L. palliseri*, p. 63.

- b^1. Head either punctured or smooth and shining, never striate.
  - a^2. Basal abdominal segment punctured.
    - a^3. Length 4–6 mm.
      - a^4. Of very slender form; meso-metanotal suture above broad and distinct .... *L. hysterica*, p. 64.
      - b^4. More robust; meso-metanotal suture above obsolete .... *L. punctiventris*, p. 64.
    - b^3. Length over 9 mm. .... *L. binghami*, p. 65.
  - b^2. Basal abdominal segment not punctured, smooth.
    - a^3. Node of pedicel short, broader than long or about as broad as long.
      - a^4. Head smooth, shining, not punctured.
        - a^5. Seen from above node of pedicel considerably more than half the length of 1st abdominal segment .... *L. emiliæ*, p. 66.
        - b^5. Seen from above node of pedicel distinctly very much less than half the length of 1st abdominal segment .... *L. lucidula*, p. 66.
      - b^4. Head punctured.
        - a^5. Mandibles toothed on inner margin.
          - a^6. Head and thorax opaque, with a blue metallic tint in certain lights .... *L. mölleri*, p. 67.
          - b^6. Head and thorax sparsely punctured, shining, not opaque, and with no metallic tint .... *L. dalyi*, p. 67.
        - b^5. Mandibles toothed at the apex only.
          - a^6. Meso-metanotal suture above obsolete.
            - a^7. Abdomen lighter in colour than head and thorax .. *L. roberti*, p. 68.
            - b^7. Abdomen concolorous with head and thorax ...... *L. coonoorensis*, p. 68.
          - b^6. Meso-metanotal suture distinct.................... *L. yerburyi*, p. 69.
    - b^3. Node of the pedicel elongate, with a sloping curve from back to front, vertically truncate posteriorly.
      - a^4. Head, thorax and abdomen with a bluish metallic reflection.
        - a^5. Apex of median lobe of clypeus transversely truncate, sometimes bidentate .... *L. chinensis*, p. 69.
        - b^5. Apex of median lobe of clypeus ending in a blunt obtusely rounded point, not transversely truncate .... *L. minchini*, p. 70.

b^4. Head, thorax and abdomen without any metallic reflection.

a^5. Antennæ remarkably long, 2nd joint of flagellum much longer than 3rd .... *L. assamensis*, p. 70.

b^5. Antennæ comparatively short; 2nd and 3rd joints of flagellum subequal.

a^6. Head without the clypeus short, only a little longer than broad; eyes somewhat anterior, below middle line of head .... *L. peuqueti*, p. 71.

b^6. Head without the clypeus much longer than broad; eyes placed about middle line of head .... *L. watsoni*, p. 72.

63. **Lobopelta ocellifera**, *Roger, Berl. ent. Zeit.* v (1861), p. 13, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 305 & 309, ☿ ♂.
Lobopelta distinguenda, *var.* andrei, *Emery, Ann. Mus. Civ. Gen.* xxv (1887), p. 431, ☿.

☿. Dark castaneous brown, smooth, polished and shining, with a very few scattered small punctures on the head; head, thorax and abdomen covered with fairly abundant long erect pilosity;

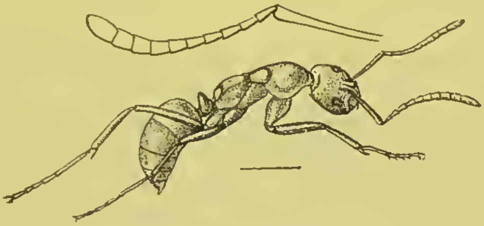


Fig. 32.—*Lobopelta ocellifera*, ☿.

pubescence wanting. Head broad, rectangular, as broad posteriorly as in front; mandibles robust, broad, finely longitudinally striate, armed at the apex with four unequal teeth, and denticulate along the inner margins; clypeus narrow, transverse, finely longitudinally striate at the sides, the medial lobe raised and rounded anteriorly; antennal carinæ short, laminate, very close together; antennæ stout, pubescent, the scape just passing the top of the head, the 1st joint of the flagellum slightly longer than the 2nd. Thorax slightly narrower than the head, viewed from the side emarginate above, the pro-meso- and meso-metanotal sutures deeply marked; metanotum compressed in front, broadening posteriorly, apical portion obliquely truncate, flat, smooth, not striate; legs long and stout. Node of pedicel convex in front, flat posteriorly, the upper margin narrow, rounded; abdomen massive, the posterior margins of the segments narrowly testaceous.

♂. Mandibles short, very acutely pointed; head rounded, the vertex above strongly convex; the mesonotum with a faintly-marked Y-shaped furrow; metanotum long, depressed, the basal portion oblique, passing by a rounded curve into the apical portion; wings hyaline with a brownish tint; legs long and slender; node of the pedicel conical.

Length, ☿ 8–9; ♂ 9–10·5 mm.

Hab. Nearly the whole of peninsular India and Ceylon, not extending to Assam or Burma.

64. **Lobopelta birmana**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 305 & 310.
Lobopelta distinguenda, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 498, *nec Emery, Ann. Mus. Civ. Gen.* xxv (1887), p. 430.

☿. Closely resembles *L. ocellifera*, Rog., but the head is shorter, more square and massive, the posterior lateral angles more

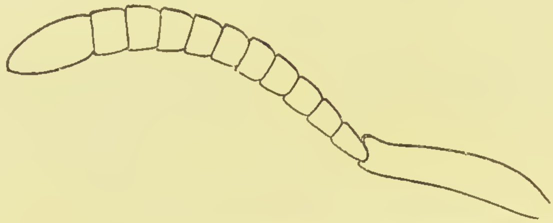


Fig. 33.—Antenna of *Lobopelta birmana*, showing broad joints.

prominent; the antennæ shorter and thicker, the scape not, or only very slightly, passing beyond the top of the head. In colour this species is slightly paler, and many specimens have a metallic bluish tint as in *L. chinensis*, Mayr. The abdomen is proportionately shorter and the constriction between the basal two segments broader, with very fine, almost obsolete transverse striæ.

♂. Similar to the ♂ of *L. ocellifera*, but shorter and more stoutly built.

Length, ☿ 7–8; ♂ 9 mm.

Hab. Assam (*Smythies*); Burma; Tenasserim (*Fea*, *Bingham*).

This is the Eastern race or representative of the continental *L. ocellifera*.

65. **Lobopelta dentilobis**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 305 & 309, ☿.

☿. Dark castaneous red, the legs slightly paler red, the sides of the thorax in certain lights with a bluish metallic lustre, as in *L. chinensis*, Mayr. Head somewhat closely and finely, thorax more sparsely punctured; abdomen smooth, polished and shining. Head, thorax and abdomen covered fairly abundantly with short, erect, pale red hairs; pubescence almost entirely wanting. Head

square, only slightly narrower posteriorly than in front; mandibles short, strong, longitudinally striate, the apex oblique, dentate; clypeus narrow, transverse, with a thick, prominent, medial, vertical carina, the anterior margin of the lobe tridentate; antennal carinæ short, very close together, laminate, coarsely punctured above; antennæ short and thick, the scape not passing beyond the top of the head, the basal two joints of the flagellum subequal. Thorax somewhat compressed, very slightly emarginate above, the pronotum longitudinally wrinkled; the pro-meso- and meso-metanotal sutures distinct; legs stout, long, the tibiæ densely pilose. Node of pedicel convex in front, flat posteriorly, the upper margin rounded; abdomen comparatively short.

Length, ☿ 5–6 mm.

Hab. Western India, Thana, Kanara (*Wroughton*); Travancore (*Ferguson*); the Nilgiris (*Daly*).

66. **Lobopelta crassicornis**, *Emery* (Leptogenys), *Ann. Mus. Civ. Gen.* xxxiv (1894), p. 462, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 304, ☿.

☿. Reddish yellow, smooth, highly polished and shining; pilosity yellowish, short, abundant on the head and abdomen.

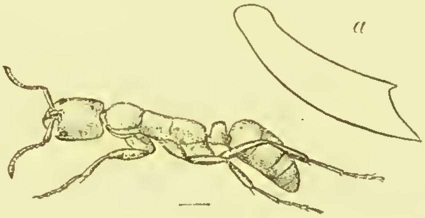


Fig. 34.—*Lobopelta crassicornis*, ☿. *a.* Mandible.

Head rectangular, a little longer than broad, and slightly broader in front than posteriorly; eyes minute; occiput transverse; mandibles short, the masticatory margin oblique, armed with three teeth; clypeus narrow anteriorly, with the medial portion angular, the apex rounded, and a medial short thick carina which extends between the antennal carinæ; these latter short, parallel, close together. Antennæ very short and thick, the scape compressed, the flagellum incrassate towards the apex, the penultimate joint much broader than long. Thorax elongate, narrow, compressed, rounded above, truncate posteriorly, the sutures fairly distinct; legs rather long and robust. Pedicel with the node thick, truncate and flat posteriorly, rounded in front, and carrying a thick strong tooth beneath pointing backwards. Abdomen elongate, cylindrical; sting exserted.

Length, ☿ 4·5–4·75 mm.

Hab. Upper Burma (*Bingham*); Tenasserim, Karennee (*Fea*).

67. **Lobopelta aspera**, *André, Rev. d'Ent.* viii (1889), p. 222, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 305, ☿.

☿. Black, shining, the mandibles, antennæ and legs dark castaneous, the flagellum and the tarsi somewhat paler in colour; head, thorax and abdomen clothed sparsely with short erect pale hairs. Head rectangular, as broad posteriorly as in front, finely striate, the striæ longitudinal between the antennal carinæ and the sides of the head and on the cheeks, and slightly more distinct, coarser and transverse on the front; mandibles long, narrow, punctured, the masticatory margin very oblique and feebly dentate; clypeus narrow, longitudinally striate, the lobe with a medial vertical sharp carina; antennal carinæ sublaminate, very close together and punctured; antennæ filiform, pubescent, the scape finely punctured, somewhat short, not extending much beyond the top of the head, the 2nd joint of the flagellum longer than the 1st; eyes placed low on the third anterior portion of the sides of the head. Thorax rugosely reticulate, not emarginate, the pro-mesonotal suture well marked, the meso-metanotal suture indicated above by a short transverse depression; legs long, slender. Node of pedicel cylindro-cubical, rugosely sculptured, about as broad as long; abdomen with the 1st and base of the 2nd segment rugose, the remainder smooth and shining.

Length, ☿ 6–6·75 mm.

Hab. The Southern Shan States, at 5000 feet (*Thompson*); Annam.

68. **Lobopelta kitteli**, *Mayr, Verh. zool.-bot. Ges. Wien*, xx (1870), p. 966, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 306 & 312, ☿.

☿. Black; the mandibles, antennæ and femora and tibiæ of the legs castaneous red, the apex of the lobe of the clypeus, the tarsi and the apex of the abdomen testaceous, shining; head, thorax and abdomen clothed with a sparse, erect, pale pilosity; pubescence entirely absent. Head broadly oval, almost as broad posteriorly as in front, very finely and regularly longitudinally striate, shining with a silky lustre; mandibles comparatively broad, linear, flat, their inner and outer sides parallel, above finely longitudinally striate; clypeus large, convex, but not carinate anteriorly, angularly produced; antennal carinæ short, laminate, very close together; antennæ filiform, stout, pubescent, the scape passing the top of the head by about one-fourth of its length; the 2nd joint of the flagellum slightly longer than the 1st. Thorax elongate, viewed from the side emarginate above; the pro-meso- and meso-metanotal sutures very deeply marked; pro-, meso- and metanotum very finely longitudinally striate, the striæ on the pronotum arched in front; apical face of the metanotum broadening towards the base and rather more coarsely transversely striate; legs stout, elongate, pubescent. Node of pedicel rugose, in certain lights appearing transversely striate; abdomen cylindrical, very smooth, shining and polished; sting largely exserted.

Length, ☿ 7–8·5 mm.

Hab. Along the foot-hills of the Himalayas from Simla to Sikhim; Calcutta (*Rothney*): Assam (*Smythies*): Burma and Tenasserim (*Fea*, *Bingham*).

69. **Lobopelta altisquamis**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 306 & 312, ☿.

☿. Closely resembles *L. kitteli*, Mayr, but the pro-mesonotal suture is very much more deeply impressed, and the mesonotum strongly convex; the node of the pedicel is larger and very much higher; the apex of the lobe of the clypeus is truncate, and the abdomen has a bluish metallic tint as in *L. chinensis*, Mayr.

Length, ☿ 9–9·5 mm.

Hab. Tenasserim; Thaungyin valley (*Bingham*).

This form is perhaps only a very strongly marked local race; but the differences between it and typical *L. kitteli*, also found in Tenasserim, seem to be constant.

70. **Lobopelta diminuta**, *Smith* (Ponera), *Jour. Linn. Soc.* ii (1857), p. 69, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 307 & 312, ☿ ♀? ♂.

Ponera læviceps, *Smith, Jour. Linn. Soc.* ii (1857), p. 69, ☿.

☿. Black; the mandibles, base of the antennæ and flagellum, and the tarsi of the legs fusco-ferruginous, the apex of the abdomen testaceous yellow. Head finely and closely striate, the striæ longitudinal on the anterior portion, transverse on the front and forehead; thorax rugose, the pronotum longitudinally and rather coarsely striate on the disc, transversely striate anteriorly, node of the pedicel and abdomen smooth and shining. Head, thorax and abdomen with sparse erect pale hairs. Head elongate oval, a little narrower posteriorly than in front; mandibles long, flat, finely longitudinally striate, widening at the masticatory margin and feebly dentate, the apex furnished with an acute curved point; clypeus triangular, the median lobe vertically carinate and produced anteriorly into a blunt point; antennæ stout, elongate, pubescent, the scape passing considerably beyond the top of the head; the 2nd joint of the flagellum somewhat longer than the 1st. Thorax constricted anteriorly into a neck, emarginate in the middle above, the sutures wide, distinct; the metanotum broadening towards the apex, the apical face transversely striate; legs long, stout, pubescent. Node of the pedicel quadrate seen from the side, rounded above, slightly broader posteriorly, and truncate in front and behind: abdomen with the constriction between the basal two segments well-marked.

♂. Resembles the ☿. Brownish black, the head globose, the scape of the antennæ short; thorax massive; wings hyaline with a brownish tint; node of the pedicel conical. Head and thorax irregularly sculptured.

Length, ☿ 6·5–7·5; ♂ 5 mm.

Hab. Extends throughout our limits and into the Malayan subregion; not recorded from the Punjab or the dry desert portions of Central India.

A very variable species. In many forms the mandibles, antennæ and legs are entirely reddish brown. In var. *læviceps*, Smith, from Borneo, found also in India and Burma, the striæ on the head are more or less effaced; var. *opacinodis*, Emery (Ann. Mus. Civ. Gen. xxv (1887), p. 433), from Burma, has the node of the pedicel sculptured and not smooth; and var. *sarasinorum*, Forel (*l. c.* xiii (1901), pp. 307 & 312), is considerably larger and more robust than the typical form. This last is found in Ceylon, and I have it also from Sikhim and Burma.

71. **Lobopelta hodgsoni**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 308 & 314, ☿.

☿. Black; the mandibles, antennæ and femora and tibiæ of the legs castaneous red, the tarsi of the legs and the apex of the abdomen testaceous yellow; pilosity exceedingly sparse, more plentiful and longer on the anterior coxæ and beneath the abdomen. Head elongately oval, constricted posteriorly, where it is distinctly narrower than in front; the whole head, including the mandibles and clypeus, finely longitudinally striate; mandibles narrow, broadening slightly towards the apex, and ending in a single acute curved tooth, the rest of the masticatory and the inner margins not dentate; lobe of clypeus triangular, very much produced anteriorly, and with a broad median vertical carina; antennæ robust, pubescent, the scape remarkably long, passing beyond the head by very nearly half its length; 2nd joint of the flagellum very little longer than the 1st. Thorax emarginate in the middle, the pro-meso- and meso-metanotal sutures distinct; the pronotum coarsely longitudinally striate and wrinkled, the posterior half of the basal face of the metanotum transversely and coarsely rugose; legs very long, robust. Node of pedicel about as long as broad, coarsely punctured, rugose; abdomen very smooth, polished and shining, the constriction between the basal two segments broad and distinct.

Length, ☿ 7 mm.

Hab. Burma, Pegu Yoma (*Allan*); Tenasserim, Thaungyin valley (*Hodgson*).

72. **Lobopelta wood-masoni**, *Forel, Jour. As. Soc. Beng.* lv (1886), pt. ii, p. 246, ☿; *Jour. Bomb. N. H. Soc.* xiii (1900), p. 308, ☿.

"☿. Long and narrow, the legs and especially the antennæ very long. Head oval. Eyes large, flat, situated at the anterior two-fifths of the head. The 2nd joint of the flagellum longer than the 1st. Mandibles rather broad, striate; their terminal margin long, sharp, with a pointed tooth at the end and an obtuse one at its posterior third. Clypeus very triangularly advanced, nearly acuminate, strongly carinate, longitudinally striate. Vertex

and occiput shining, nearly smooth. Mesothorax strongly constricted behind the mesonotum, the constriction much widened. Mesonotum small and narrow. The basal surface of the metanotum narrow, rounded, as long as the pronotum and the mesonotum together. The declivous face moderately short, transversely wrinkled, rounded at the sides and above. The rest of the thorax shining and nearly smooth, except at the sides of the mesothorax and of the metathorax, which are more or less rugose. Node of pedicel raised, narrowed in front, smooth and shining, as long as the breadth of its posterior surface. Abdomen shining and nearly smooth, strongly constricted after the 1st segment. Here and there a few erect hairs on the legs, the scapes, and the underside of the body. Recumbent pubescence almost wanting. Yellowish or reddish brown, darker over the head, the thorax and the node of pedicel. Flagellum, tibiæ and tarsi testaceous.

"*Length* 6·2 mm. Sibsagur, Assam" (*apud Forel*).

73. **Lobopelta striatula,** *Emery* (Leptogenys), *Ann. Mus. Civ. Gen.* xxxiv (1894), p. 461, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 307, ☿.

☿. Resembles *L. diminuta*, Smith, but is smaller and slighter; the head and thorax are more distinctly sculptured, and the node of the pedicel and abdomen highly polished and shining. Black, with the apex of the mandibles, the flagellum of the antennæ, and joints (sometimes the whole) of the legs castaneous brown. Head, thorax and abdomen with a very few scattered erect hairs; pubescence wanting. Head broadly oval, longer than broad, finely but very irregularly longitudinally striate, the striæ broken and interrupted, giving an opaque rugose appearance; mandibles comparatively broad, the masticatory margin dentate, much broader proportionately than in most of the species of *Lobopelta*; clypeus narrow transverse, the median lobe carinate; antennæ filiform, long, the 2nd joint of the flagellum longer than the 1st. Thorax: the sculpture similar to that on the head, the striæ on the pronotum more regular, concentric, the pro-meso- and meso-metanotal sutures fairly well marked; legs long, robust, pubescent. Node of the pedicel compressed, slightly longer than broad; abdomen short, the constriction between the basal two segments well marked.

Length, ☿ 5·5–6·5 mm.

Hab. Burma: Maymyo, 3000 feet (*Bingham*), Toungoo (*Hauxwell*); Tenasserim, Karennee (*Fea*).

74. **Lobopelta palliseri,** *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 307 & 313, ☿.

☿. Resembles *L. diminuta*, Smith, but is much more robustly built and larger. Black, the extreme base of the antennæ, the apex of the scape of the flagellum, and of the femora of the legs and the whole of the tarsi reddish brown. Head, thorax and

abdomen with sparsely scattered, rather long and soft, erect, pale hairs. Head broad, very nearly as broad as long, and as broad posteriorly as in front, more distinctly and coarsely striate than in *L. diminuta*; the striæ longitudinal anteriorly, transverse on the front and forehead; mandibles comparatively long, striate, linear, not dentate, but the outer margin ending in an acute curved point; clypeus longitndinally striate, the median lobe barely subcarinate; antennæ comparatively short, pubescent, the scape passing slightly beyond the top of the head. Thorax viewed in profile with a wide bnt shallow emargination, the mesonotum depressed, irregularly longitudinally wrinkled and striate, the sutures rather deeply impressed; legs pubescent, the tarsi densely so. Node of the pedicel very high, a little longer than broad, above coarsely longitudinally wrinkled; abdomen very smooth, polished and shining.

Length, ☿ 7–8 mm.

Hab. Western India, Kanara (*Palliser*); Tenasserim, Mergui (*Bingham*).

I am not certain whether I have identified this species correctly.

75. **Lobopelta hysterica**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 305 & 311, ☿.

☿. Black; the mandibles, antennæ, femora, tibiæ and tarsi of the legs, and apex of the abdomen rufo-castaneous, the coxæ of the legs dark castaneous, almost black; head, thorax, node of the pedicel and basal two segments of the abdomen densely punctured, opaque, the apical margin of the 2nd and the remaining abdominal segments smooth and shining with only a few scattered punctures; pilosity extremely sparse; pubescence wanting except on the antennæ and tibiæ of the legs. Head longer than broad, rounded posteriorly and as broad as in front; mandibles narrow, not dentate, broadening towards the apex and ending in a sharp point; clypeus triangular, the median lobe broadly carinate, the apex truncate and rounded; antennæ elongate, the scape passing well beyond the top of the head, the basal two joints of the flagellum subequal. Thorax elongate, not emarginate, the pro-meso- and meso-metanotal sutures distinct, the latter broad but not deep; legs stout and long, the tibiæ and tarsi paler in colour than the femora. Node of the pedicel high, cubical, about as long as broad; abdomen comparatively massive, longer than the thorax.

Length, ☿ 4–4·5 mm.

Hab. Western India (*Wroughton*); Ceylon (*Yerbury*).

76. **Lobopelta punctiventris**, *Mayr, Verh. zool.-bot. Ges. Wien,* xxviii (1878), pp. 665 & 666, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 305, ☿.

☿. Black; the mandibles, base of the scape and the flagellum of the antennæ, the trochanters, bases of the femora, tibiæ and tarsi of the legs and the apex of the abdomen rufo-ferruginous, the

coxæ and femora dull black, and the tibiæ above shaded with fuscous black; head, thorax and abdomen densely punctured, the punctures somewhat coarser than in *L. hysterica*, and with scattered erect short black hairs. Head with the mandibles and antennæ as in *L. hysterica*, but the clypeus is broader and not so strongly carinate. Thorax stouter than in the above species, rounded above, not emarginate, and with the meso-metanotal suture obsolete above; legs as in *L. hysterica*. Node of the pedicel comparatively larger, cubical, seen from above longer than broad; abdomen massive, about as long as the thorax.

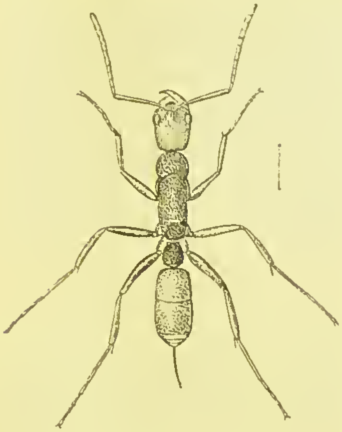


Fig. 35.
Lobopelta punctiventris, ☿.

Length, ☿ 5–6 mm.

Hab. India, Sikhim (*Möller*), Calcutta (*Rothney*).

This species is very closely allied to *L. hysterica*, but is larger and more stoutly built.

77. **Lobopelta binghami**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 305 & 310, ☿.

☿. Black; the mandibles, antennæ and femora, tibiæ and tarsi of the legs dull castaneous red, the scape of the antennæ and the femora of the legs of a darker red, the apical margins of the 2nd and succeeding abdominal segments narrowly translucent, testaceous yellow; head, thorax and basal segment of the abdomen

Fig. 36.—*Lobopelta binghami*, ☿. *a.* Head from front.

opaque, very finely and densely punctured, on the basal portion of the metanotum posteriorly, and on the node of the pedicel the punctures are coarser; 2nd and succeeding segments of the abdomen dull black, slightly punctured; the head, thorax and abdomen covered with abundant short erect black hairs; pubescence wanting. Head oval, slightly narrowed posteriorly; mandibles long,

flat, linear and narrow, not dentate; clypeus with the median lobe strongly carinate, produced anteriorly, the apex truncate, the anterior margin of the clypeus with a distinct tooth on each side of the median projection; antennæ stout, elongate, pubescent, the scape reaching for about one-third of its length beyond the top of the head, the 2nd joint of the flagellum more than twice as long as the 1st. Thorax rounded above, not emarginate, the pro-meso- and meso-metanotal suture above distinct but not deeply impressed; legs pubescent, long, and stout. Node of the pedicel cubical, rounded above, somewhat longer than broad; abdomen massive, much longer than the thorax.

Length, ☿ 9–10 mm.

Hab. Upper Burma; Tenasserim, Karennee (*Bingham*).

A very distinct species.

78. **Lobopelta lucidula**, *Emery* (Leptogenys), *Ann. Mus. Civ. Gen.* xxxiv (1894), p. 462, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii. (1900), p. 306, ☿.

☿. Brownish red, more or less shaded with fuscous, the mandibles, antennæ and legs paler reddish; pilosity short and somewhat sparse. Head, thorax and abdomen smooth and shining, with a few scattered punctures on the latter two. Head with the mandibles somewhat scutiform, longer than broad, with the occipital margin transverse; mandibles long and narrow, the masticatory margin with 8–10 irregular-sized teeth; clypeus comparatively large, triangular, very strongly medially carinate; antennæ very stout and thick, the scape a little flattened; antennal carinæ narrow, short, close together; eyes proportionately rather small. Thorax compressed, rounded above; pro-mesonotal suture more distinct than the meso-metanotal suture; metanotum posteriorly truncate, the basal portion passing into the apical portion by a rounded curve; legs moderately stout, rather long. Pedicel with a node higher than broad or long, rounded above, level with the top of the metanotum; abdomen from above elongate oval, somewhat gibbous anteriorly.

Length, ☿ 4·5–5 mm.

Hab. Sikhim 4000 feet (*Möller*); Burma, Karennee (*Fea*).

79. **Lobopelta emiliæ**, *Forel, Ann. Soc. ent. Belge*, xlvi (1902), p. 294, ☿.

☿. Pale yellowish red, the legs pale dull yellow, head, thorax and abdomen smooth and slightly shining; pilosity pale yellow, somewhat abundant, especially on the abdomen, on the legs and tarsi it is oblique and rather long. Head rectangular, slightly convex posteriorly, where it is as broad as in front; mandibles long, linear, narrow, broadening very slightly towards the apical margin, the latter obscurely dentate; clypeus rather large, medially carinate and produced; antennal carinæ short, close together, the front above them with a very short, deeply impressed and very

narrow groove; antennæ long and thick; eyes proportionately moderate in size, lateral, placed anterior to the middle of the head. Thorax long, narrow, compressed, the sutures fairly distinct but not deeply impressed; the metanotum massive, obliquely truncate posteriorly; legs long, rather slender. Pedicel: the node broader than long, rounded above, subtruncate in front and vertically truncate posteriorly; abdomen long, cylindrical.

Length, ☿ 4–4·2 mm.

Hab. Guzerat (*Wroughton*).

Closely allied to *L. castanea*, Mayr, from Africa.

80. **Lobopelta moelleri**, sp. n.

☿. Head and thorax opaque dull black with a bluish metallic tint; abdomen castaneous brown, highly polished and shining; the mandibles, clypeus, antennæ, apex of the metanotum on the sides, legs and articulations posterior and anterior of the pedicel dull rufo-ferruginous. Head, thorax and abdomen covered with abundant short semi-erect white hairs. Head sparsely punctured, much longer than broad, the occiput transverse, the cheeks straight, very slightly convex; mandibles strongly dentate, minutely, finely, longitudinally striate; clypeus comparatively large, convex, not vertically carinate but with a remarkably raised ridge extending from the antennal carinæ to the lateral angles of the clypeus; antennal carinæ short, very close together; antennæ elongate, massive, the scape extending a little beyond the top of the head; the basal two joints of the flagellum subequal, longer than the succeeding joints, which however are all longer than broad. Thorax comparatively massive and broad, rounded above, sparsely punctured and wrinkled, not emarginate, the pro-mesonotal suture distinct, the meso-metanotal suture barely indicated, the metanotum nearly vertically truncate at apex, its apical face with a broad shallow vertical groove; legs long and stout, slightly pubescent. Node of the pedicel short, as broad as long, smooth and shining, very rounded and convex anteriorly, vertically truncate posteriorly; abdomen shorter than the thorax, with the apical margins of the segments broadly testaceous.

Length, ☿ 5 mm.

Hab. Sikhim at 4000 feet (*Möller*).

81. **Lobopelta dalyi**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 306 & 311, ☿.

☿. Black, shining; the mandibles, flagellum of the antennæ and the tarsi rufo-ferruginous; scape of the antennæ, and the coxæ, femora, and tibiæ of the legs dark castaneous brown; apex of the abdomen testaceous yellow. Head and thorax very sparsely punctured, the pronotum with a few longitudinal wrinkles; abdomen smooth, highly polished. The whole insect covered with very sparsely scattered pale yellow hairs. Head longer than broad; mandibles large, very strongly dentate on the inner and

masticatory margins; clypeus triangular, broadly vertically carinate in the middle, the apex of the median lobe pointed and translucent yellow; antennæ long, robust, subpubescent, the scape extending slightly above the top of the head, the basal three joints of the flagellum subequal, the flagellum distinctly thicker towards the apex. Thorax rounded above, not emarginate, pro-mesonotal suture distinct, meso-metanotal suture obsolete above; legs long, robust. Node of pedicel conical, somewhat flat posteriorly; abdomen not quite so long as the thorax, the constriction between the basal two segments slight.

Length, ☿ 4·5 mm.

Hab. Western India, the Nilgiris, Kanara, Mysore (*Daly*, *Wroughton*); Cochin (*Ferguson*).

82. **Lobopelta roberti**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 306 & 311, ☿.

☿. Dark castaneous brown, the mandibles, antennæ and legs light reddish brown; head and thorax with fairly abundant minute punctures; abdomen smooth and shining; the front of the head, the thorax above and the abdomen, chiefly towards the apex and underneath, with short erect pale hairs. Head oval, longer than broad; mandibles stout but narrow, dentate on the masticatory margin; clypeus transverse, strongly vertically carinate, rounded anteriorly, the median lobe prolonged by a translucent yellow chitinous membrane; antennæ pubescent, thick and long, the scape passing beyond the top of the head; the 1st and 3rd joints of the flagellum each longer than the 2nd. Thorax above not emarginate; the pro-mesonotal suture distinct, the meso-metanotal suture scarcely indicated, the metanotum compressed; legs stout, long. Node of the pedicel broader than long, flat in front and posteriorly; abdomen rather more massive proportionately than in *L. dalyi*; the constriction between the basal two segments more distinct.

Length, ☿ 3·5 mm.

Hab. Assam (*Smythies*); Upper Burma, the Shan States (*Thompson*).

83. **Lobopelta coonoorensis**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 306 & 311, ☿.

☿. Resembles *L. roberti*, but is slightly larger and darker, with a proportionately larger head and shorter mandibles, which latter are longitudinally striate. Piceous brown, the mandibles, antennæ and legs lighter reddish brown. Head, thorax and abdomen polished, shining, the two former regularly and somewhat closely and finely punctured, clothed with short erect pale reddish hairs. Head rectangular, much longer than broad; mandibles narrow, dentate on the masticatory margin; clypeus transverse, narrow, carinate down the middle and obscurely striate like the mandibles; antennal hollows very large; antennæ thick, pubescent;

scape not reaching beyond the top of the head; basal two joints of the flagellum subequal, all the joints thicker and the apex of the flagellum more incrassate than in *L. roberti*. Thorax as in *L. roberti*, punctures fewer and more scattered than on the head; pronotum with a few obscure longitudinal wrinkles; legs long and stout. Node of the pedicel longer than in *L. roberti*, very convex and rounded in front, abruptly vertically truncate posteriorly; abdomen massive, gibbous in front, the constriction between the basal two segments not well marked.

Length, ☿ nearly 4 mm.

Hab. Western India, the Nilgiri Hills (*Wroughton*).

84. **Lobopelta yerburyi**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 306 & 311, ☿.

☿. Castaneous red, slightly shining; the mandibles, flagellum of the antennæ and the tarsi paler yellowish red. Head, thorax and abdomen, especially the mandibles, back of the thorax and the legs, clothed with short, soft, pale semi-recumbent hairs. Head finely and closely, thorax more sparsely punctured; node of the pedicel and abdomen smooth. Head much longer than broad; mandibles stout, finely striate, their masticatory margin distinctly dentate; clypeus convex, but not distinctly carinate; the median lobe triangularly advanced, and bordered by a narrow translucent chitinous membrane; antennæ pubescent, long and thick, the scape reaching beyond the top of the head, 2nd joint of the flagellum equal to the 3rd and longer than the 1st. Thorax above not emarginate, the pro-meso- and meso-metanotal sutures deeply impressed; metanotum slightly compressed, the apex roundly truncate; legs very stout and long, the anterior femora and tibiæ broad, slightly compressed. Node of the pedicel conical, broader than long, rounded anteriorly and above; abdomen short and broad, the constriction between the basal two sègments not well marked.

Length, ☿ 4·5 to nearly 5 mm.

Hab. Ceylon (*Yerbury*, *Green*).

85. **Lobopelta chinensis**, *Mayr, Verh. zool.-bot. Ges. Wien*, xx (1870), p. 965, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 308 & 313, ☿ ♂.

☿. Black, smooth and shining, sparsely punctured, and with a sparse pale erect pilosity, most dense towards the apex of the abdomen; in certain lights the insect has a beautiful purplish-blue metallic lustre; mandibles, flagellum of the antennæ, tibiæ and tarsi castaneous red, tarsi somewhat lighter in colour; apex of the abdomen testaceous yellow. Head oval, constricted above the eyes; the occiput narrow, transverse; mandibles narrow, linear, punctured, the apex ending in an acute curved point; clypeus triangular, the median lobe acutely vertically carinate, apex

truncate; antennæ long, pubescent, the scape extending well beyond the top of the head; the 2nd joint of the flagellum more than twice as long as the 1st. Thorax broad, not narrowed anteriorly into a collar; pronotum very convex, pro-meso- and meso-metanotal sutures very distinct and broad; thorax viewed from the side widely emarginate in the middle; legs stout and long. Node of the pedicel rounded above, truncate anteriorly and posteriorly, twice as long as broad and twice as high posteriorly as in front; abdomen massive, the constriction between the basal two segments well marked.

♂. Similar to the ☿; the head globose, the mandibles much shorter, the thorax massive, the oblique furrows on the mesonotum distinct, the scutellum strongly convex; the wings hyaline, slightly pubescent and infuscate.

Length, ☿ 8–10; ♂ 9 mm.

Hab. More or less all Continental India and Ceylon, except the drier portions of Central and Western India and the Punjab. This species is found in China and Japan, but not recorded from Assam, Burma, or Tenasserim.

86. **Lobopelta minchini**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 308 & 313, ☿ & ♂.

☿. Resembles *L. chinensis*, but is smaller and more pubescent; the mandibles are broader and longer, and the head proportionately not so long nor so narrow at the occiput. Black; the mandibles, antennæ and legs castaneous red, the head, thorax and abdomen in certain lights with a purplish-blue metallic tint. Sculpture as in *L. chinensis*. Antennæ pubescent, longer proportionately than in that species; the scape extending beyond the top of the head by more than one-third of its length; the 2nd joint of the flagellum twice the length of the 1st and about one-third of its length longer than the 3rd joint. Thorax not so distinctly emarginate as in *L. chinensis*, but the pro-meso- and meso-metanotal sutures as deeply marked. Node of the pedicel somewhat shorter and slightly higher posteriorly; abdomen as in *L. chinensis*.

Length, ☿ 6·5–7 mm.

Hab. Bengal; S. India (*Rothney*); Burma (*Minchin*).

I am doubtful as to the identification of this species: three specimens of a *Lobopelta* I have from the Pegu Yoma answer fairly well to Dr. Forel's description of *L. minchini*, especially in the shape of the pedicel, which curves gradually from back to front and ends in a short flat portion. All three specimens are more densely pubescent than any other of the Indian species of *Lobopelta*.

87. **Lobopelta assamensis**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 308 & 313, ☿.

☿. Castaneous red, smooth and shining; the mandibles, flagellum of the antennæ and legs, including the coxæ, paler red; the tibial calcaria, the apical margins of abdominal segments 1–4 and the

whole of the apical segment testaceous yellow. Pilosity fairly abundant, pale red, soft and erect. Head elongate, much longer than broad and almost as broad posteriorly as in front; mandibles long, linear, narrow, not dentate, but the lower angle of the masticatory margin ending in an acute curved point; clypeus triangular, anteriorly submargined, the median lobe vertically carinate, blunt at apex; antennæ pubescent, long, comparatively stout, the scape extending beyond the top of the head, the 2nd joint of the flagellum very long, nearly three times as long as the 1st; eyes comparatively very large, depressed and flat. Thorax slightly emarginate above, the pro-meso- and meso-metanotal sutures distinct, the metanotum considerably broadened towards the apex and rounded above; legs long and stont, pubescent. Node of the pedicel strongly compressed, about a quarter as long again as high posteriorly; abdomen long and massive, longer than the thorax.

Length, ☿ 6·5–7 mm.

Hab. Assam, the Gáro hills (*Long*).

88. **Lobopelta peuqueti**, *Er. André, Rev. d'Ent.* vi (1887), p. 292, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 309, ☿.

☿. Black, smooth and shining; the apex of the mandibles, the flagellum of the antennæ, and the femora, tibiæ and tarsi of the legs more or less dark castaneous brown, lightest on the flagellum and tarsi. The front of the head, the thorax, node of pedicel and abdomen covered with short erect pale hairs. Head oval, somewhat

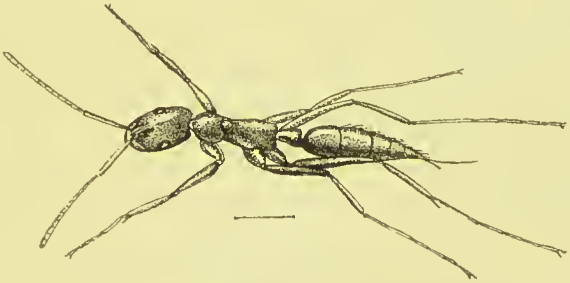


Fig. 37.—*Lobopelta peuqueti*, ☿.

narrower posteriorly than in front; mandibles flat, linear, not dentate; clypeus triangular, the median lobe strongly carinate; the antennæ thick, the scape opaque, extending well beyond the top of the head; the face just above the sides of the clypeus and on each side of the antennal carinæ flat, very minutely, closely, but superficially punctured, the 2nd joint of the flagellum half as long again as the 1st. Thorax very narrow, not emarginate above, the pro-meso- and meso-metanotal sutures very distinct, the metanotum compressed; legs long, slender, pubescent. Node of the pedicel large, very strongly compressed, curved to the anterior end,

vertically truncate posteriorly; abdomen elongate, very nearly as long as the head and thorax united.

Length, ☿ 6 mm.

Hab. Ceylon (*Simon*); Burma, Bhamo (*Fea*), the Shan States (*Thompson*); Annam (*Peuquet*).

89. **Lobopelta watsoni**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 309.

"☿. Node of pedicel one-fourth longer than high posteriorly (in *L. peuqueti* it is only a little longer than it is high posteriorly), and $2\frac{1}{4}$ times longer than broad (twice in *L. peuqueti*). Eyes situated in the middle of the sides of the head (in *L. peuqveti* they are more anterior). Head without the clypeus longer than broad." (*Forel.*)

Length, ☿ 5 mm.

Hab. Upper Burma (*Watson*).

This species, or, as Dr. Forel makes it, race of *L. peuqueti*, is unknown to me. In Burma I found only typical *L. peuqueti*, from which this species seems to differ chiefly in its much more strongly compressed and longer node to the pedicel.

Genus **ODONTOPONERA**.

Ponera, pt., *Smith, Cat.* vi (1858), p. 86, ☿.
Odontoponera, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 717, ☿.

Type, *O. transversa*, Smith, from Borneo.

Range. Indo-Malayan region.

☿. Head quadrate, the occiput slightly emarginate, the posterior lateral angles rounded; mandibles powerful, subtriangular, strongly dentate; clypeus narrow, its anterior margin transverse, produced posteriorly to a point between the antennal carinæ; these latter parallel, curved posteriorly, triangularly laminate in front, covering the base of the antennæ; antennæ 12-jointed, cylindrical, stout, the scape passing by very little beyond the top of the head; the 2nd joint of the flagellum very little longer than the 1st or 3rd; eyes proportionately rather small, placed below the middle line of the head. Thorax massive; the pronotum convex, anteriorly narrowed into a short collar, the anterior lateral angles stoutly dentate; pro-meso- and meso-metanotal sutures distinct above; mesonotum transversely oval, slightly convex; metanotum slightly compressed, the basal portion passing into the apical portion by a gradual slope; the latter broad, flat, with a denticulate ridge on each side dividing it from the sides of the metanotum; legs moderately long, robust; femora and tibiæ cylindrical. Pedicel one-jointed, node moderately raised, flattened anteriorly and posteriorly, cuneiform, its upper border emarginate; abdomen comparatively short, the constriction between the basal two segments distinct. The head, thorax and node of pedicel beautifully and evenly striate.

♀. Very similar to the ☿; the mesothorax and scutellum large, the metanotum short, the node of the pedicel not striate, the abdomen more massive; wings brownish hyaline; ocelli present, minute.

Only one species of this genus is known.

90. **Odontoponera transversa**, *Smith* (Ponera), *Jour. Linn. Soc.* ii (1857), p. 68, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 314, ☿.

☿. Characters of the genus. Black, the mandibles, antennæ and legs dark castaneous, the mandibles and clypeus finely longitudinally striate, the anterior margin of the latter denticulate; the

a

Fig. 38.—*Odontoponera transversa*, ☿. *a.* Head from front.

striæ on the head outwardly divergent from a medial longitudinal line, the striæ on the thorax and node of the pedicel transverse; abdomen smooth but dull, with piligerous points in the smaller form or variety. Head, thorax and abdomen covered with reddish scattered erect hairs; pubescence yellow, seen only in certain lights, fairly dense on the antennæ and legs.

♀. Legs much darker than in the ☿, almost black, apex of the abdomen testaceous brown; the striæ on the head divergent, and on the pro- and mesonotum transverse as in the ☿, on the scutellum they are longitudinal and on the median segment almost effaced in some specimens.

Length, ☿ 9–12; ♀ 11–13 mm.

Hab. Spread throughout the Indo-Malayan region.

This species varies a good deal in colour. I have seen specimens from Singapore of a dark ferruginous red all over, and others from South Tenasserim with the mandibles, legs and a portion of the thorax only of that colour, the rest black.

Genus **PLATYTHYREA.**

Pachychondyla, pt., *Smith, Cat.* vi (1858), p. 108, ☿ ♂.
Ponera, pt., *Roger, Berl. ent. Zeit.* iv (1860), p. 295, ☿.
Platythyrea, *Roger, Berl. ent. Zeit.* vii (1863), p. 172.

Type, *P. punctata*, Smith, from St. Domingo, America.
Range. Neotropical, African, and Indo-Malayan regions.

☿. Head broadly rectangular, strongly convex, much broader posteriorly than in front; mandibles triangular, the masticatory margin broad, dentate; clypeus transverse, somewhat diamond-shaped, angular anteriorly in the middle, the posterior suture not distinct, sometimes effaced; antennal carinæ very wide apart, laminate; antennæ 12-jointed, moderately thick, cylindrical; eyes comparatively large, placed well forward. Thorax elongate, broad and strongly convex in front, the meso- and metanotum rounded above and narrower than the pronotum; pro-mesonotal suture fine, narrow, but distinct, meso-metanotal suture obsolete; metanotum posteriorly bidentate, or emarginate above; legs stout, moderately long; femora and tibiæ cylindrical, claws simple. Pedicel one-jointed, the node not higher than the metanotum, more or less cylindrical; abdomen about as broad as the thorax, the 2nd segment longer than the 1st, the constriction between the basal two segments not well-marked.

Key to the Species.

a. Node of the pedicel posteriorly bidentate .... *P. sagei*, p. 74.
b. Node of the pedicel posteriorly not bidentate.
  a'. Antennal carinæ not covering the basal articulation of the antennæ .... *P. wroughtoni*, p. 75.
  b'. Antennal carinæ entirely covering the basal articulation of the antennæ .... *P. victoriæ*, p. 75.

91. **Platythyrea sagei**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 314 & 315, ☿.

☿. Black, pruinose, opaque all over, not shining; mandibles, antennæ and legs castaneous red. Pilosity almost entirely wanting, confined to a few erect pale hairs at the apex of the abdomen; pubescence fine and silky, extremely short and to be seen only in certain lights. Head not or very slightly emarginate posteriorly, the scape of the antennæ extending beyond the top

Fig. 39.—*Platythyrea sagei*, ☿.

of the head; 1st joint of the flagellum longer than the 2nd. Thorax: the tooth on each side of the apex of the basal portion of the metanotum tuberculate, pointing backwards and outwards. Node of the pedicel slightly compressed, truncate anteriorly and posteriorly, the tooth on each side posteriorly tuberculate and pointing outwards and backwards. For the rest the characters of the genus.

Length, ☿ 6·5–7 mm.
Hab. India, recorded so far only from the Punjab (*Sage*) and from Kanara (*Wroughton*).

92. **Platythyrea wroughtoni**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 314 & 315, ☿.

☿. Black, with a silky pruinosity, opaque; the mandibles, antennæ, legs and apex of abdomen brownish yellow; pilosity reduced to a few short erect yellow hairs at the apex of the abdomen; pubescence very short, fine and silky, giving less of a hoary-grey pruinose appearance than in *P. sagei*. Head slightly emarginate posteriorly, not so convex in front as in *P. sagei*; antennal carinæ laminate but rather narrow. Thorax as described in the characters for the genus, but the metanotum emarginate rather than bidentate posteriorly, the basal portion of the metanotum margined at apex, the apical portion more or less concave; legs short and stout. Node of the pedicel cylindrical, truncate anteriorly and posteriorly, about twice as long as broad, the apex posteriorly above medially pinched up into an obtuse point; abdomen rather massive.

Length, ☿ 3·5 mm.
Hab. Travancore (*Ferguson*); Mysore (*Wroughton*); Madras (*Rothney*).

93. **Platythyrea victoriæ**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 315 & 316, ☿.

☿. Very similar to *P. wroughtoni*, Forel; in fact a barely separable race. Larger, with comparatively shorter antennæ, the antennal carinæ distinctly more swollen and broader. Thorax with the metanotum as in *P. wroughtoni*, but not so deeply emarginate posteriorly. Node of the pedicel comparatively shorter, about once and a half (twice in *P. wroughtoni*) as long as broad.

Length, ☿ 4·5 mm.
Hab. Recorded from Bengal (*Rothney*), Western India, Mysore (*Wroughton*).

Genus DIACAMMA.

Formica, pt., *Fabr. Syst. Ent.* (1775), p. 393, ☿.
Ponera, pt., *Le Guill. Ann. Soc. Ent. Fr.* x (1841), p. 318, ☿.
Diacamma, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 718, ☿.

Type, *D. rugosum*, Le Guillou, from Borneo.
Range. Indo-Malayan and Australian regions.

☿. Head oval; mandibles comparatively large, broad, triangular, the masticatory margin strongly toothed; clypeus extended posteriorly into a point between the antennal carinæ; these latter very close together, anteriorly laminate; antennæ 12-jointed,

long, filiform, the scape extended beyond the top of the head. Thorax above rounded, slightly compressed posteriorly, pronotum strongly convex and as broad as the head; pro-mesonotal suture always distinct; legs long and stout; femora and tibiæ cylindrical, claws simple. Pedicel one-jointed, the node on a level with or higher than the metanotum, arched and generally very convex in front, flat or a little concave posteriorly, above *always* armed with two spines; abdomen cylindrical, the constriction between the basal two segments well-marked. *Head, thorax and pedicel always, and a portion of the abdomen also in the majority of species, very beautifully and regularly striate.*

♂. Similar to the ☿ but more elongate. Head globose, wider than the thorax; mandibles short, cylindrical, acutely pointed at apex; antennæ filiform, scape very short, about half the length of 2nd joint of the flagellum; eyes and ocelli large and very prominent, the space between the latter equal to the space between the orbit of the eye and the lateral ocelli; thorax very gibbous, the mesonotum with a Y-shaped furrow; the scutellum large, convex, separated from the mesonotum by a crenulate transverse impressed line; postscutellum and metanotum depressed, oblique, rounded above; legs very slight, elongate, femora slightly compressed, claws simple. Node of the pedicel more or less conical, a little flat above, *without spines*; abdomen elongate, rather massive for males. The beautiful regular striæ on the head, thorax and pedicel, conspicuous in the ☿, feeble and not distinct.

♀. Unknown *.

Mr. Rothney (Tr. Ent. Soc. 1889, p. 361) writes very fully on the habits of *D. vagans*, Smith. I agree with him that the species of this genus are by far the most intelligent of all Oriental ants.

Key to the Species.

A. First abdominal segment not striate.
  a. Node of pedicel very strongly laterally compressed, much longer than broad . . *D. scalpratum*, p. 77.
  b. Node of pedicel not laterally compressed, quite as broad as long . . . . *D. cyaniventre*, p. 78.
B. First abdominal segment striate.
  a. Pronotum longitudinally striate . . . . *D. assamense*, p. 79.
  b. Pronotum with transversely arched striæ, which are more or less concentric anteriorly.
    a'. First abdominal segment with the striæ anteriorly in concentric arches, in the middle divergent . . . . *D. ceylonense*, p. 79.

* In vol. xii, p. 756, of the Jour. Bomb. N. H. Soc. I gave an account of the finding of an ant I thought was the ♀ of *D. vagans*, Smith. I regret to say that I was mistaken; further examination of the one specimen I kept has shown it to be only a large ♂; the ♀ of *Diacamma* remains, therefore, still undiscovered.

b'. First abdominal segment with all the striæ in concentric arches from back to front.
a². Nodal spines attenuate at base, pointing obliquely outwards, and forming a distinct angle with the upper surface of the node .... *D. sculptum*, p. 80.
b². Nodal spines rather thick at base, pointing backwards in continuation of the upper surface of the node, not obliquely outwards .... *D. vagans*, p. 81.

94. **Diacamma scalpratum**, *Smith* (Ponera), *Cat.* vi (1858), p. 84, pl. 6, figs. 21 & 22, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 317, ☿.

☿. Black, with sparse erect pale hairs, and a fine sericeous yellow pubescence, very sparse on the head and thorax, dense on the abdomen. Head rectangular, the posterior lateral angles rounded; mandibles powerful, armed with 7 or 8 large teeth, with smaller teeth between them; clypeus convex, the median lobe produced and broadly rounded at apex, dull and opaque, faintly obliquely striate at the sides; antennæ finely reticulate, punctate, pubescent and pilose, the 2nd joint of the flagellum longer than the 1st; the whole head above the antennæ regularly longitudinally striate. Thorax: the pronotum broad, rounded, convex, constricted anteriorly into a sort of collar which is strongly depressed, opaque but not striate, the disc of the pronotum with one or two transverse striæ surrounded by concentric striæ; mesonotum narrow, transverse, punctured, not striate; metanotum long, compressed, with concentric striæ on the basal portion above, oblique striæ on the sides, the apex obliquely truncate, strongly margined and transversely striate; the apical face slightly concave; legs densely pilose and pubescent. Node of the pedicel twice as long as broad, truncate anteriorly and posteriorly, above flat, not striate, sloping from back to front, posteriorly armed with two acute short parallel spines, longitudinally and somewhat obliquely striate on the sides: abdomen massive, sting exserted.

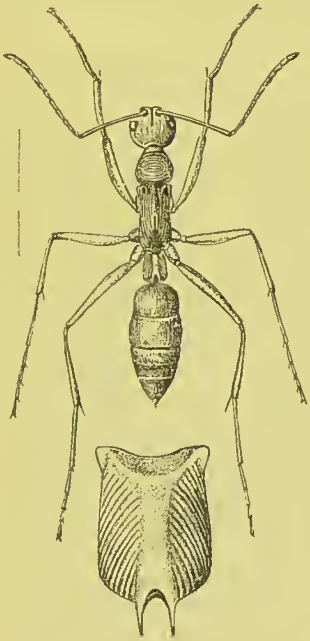


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Fig. 40.
Diacamma scalpratum, ☿.
a. Node of pedicel.

"♂. The mandibles are narrow and feeble, with the apex

rounded. As in the ☿, the clypeus projects in the form of a rounded lobe, the palpi are much longer. The frontal laminæ appear to be wanting, that is to say, they are reduced to a raised margin on the inner side of the insertion of the antennæ; these are elongate with the scape large and somewhat incrassate, the 2nd joint very small, transverse, the following much longer (the 3rd joint is about three times as long as the scape and the 2nd joint united). The eyes are large and elongate. The thorax is destitute of parapsidal furrows; the metanotum is unarmed, feebly impressed along the median line. The pedicel has the form of an elevated, somewhat gibbous node, without teeth or spines above. The specimen from Java offers some traces of the regular sculpture which is so marked in the ☿, inferiorly in both specimens it is armed with a tooth on its anterior margin. The abdomen is distinctly constricted between the 2nd and 3rd segments; the pygidium is produced into a long spine incurved at base, on both sides of which project as two cerci the external genital valves; the hypopygium is rounded. The wings have, as in the rest of the *Poneridæ*, two closed cubital and one discoidal cell." (*Emery*.)

Length, ☿ 15–18; ♂ 12–13 mm.

Hab. Sikhim (*after Forel*); Assam (*Long and Jewett*); and throughout Burma and Tenasserim (*Fea and Bingham*).

95. **Diacamma cyaneiventre**, *Er. André, Rev. d'Ent.* vi (1887), p. 293, ☿; *Forel* (D. rugosum *race* cyaniventre), *Jour. Bomb. N. H. Soc.* xiii (1900), p. 318, ☿.

☿. Black, with a fairly abundant erect pilosity and dense yellow fine sericeous pubescence, particularly dense on the antennæ and legs. Head broad, very rounded and convex posteriorly; mandibles punctured, not striate, strongly dentate; clypeus convex, the median lobe pinched and raised at base, rounded anteriorly, antennal laminæ covering the base of the antennæ, very broad; head above the clypeus regularly and somewhat coarsely striate, the striæ longitudinal in the middle of the front, inclined obliquely inwards at the sides. Thorax narrower than the head; the pronotum with transverse striæ above, curved longitudinal striæ on the sides; mesonotum narrow, fairly distinct, opaque not striate; metanotum striated in elongate concentric loops from base to apex; legs densely pruinose and pubescent. Node of the pedicel with concentric striæ, much higher than broad or long, flat posteriorly, convex in front, (viewed from the front the sides are arched outwards), narrowed at base and apex, nodal spines moderately far apart, short, and pointing upwards; abdomen, except for the pubescence, smooth and shining, with a metallic-blue reflection in certain lights, the basal segment highly polished.

Length, ☿ 10–11 mm.

Hab. Cochin (*André*); Ceylon (*Green*).

96. **Diacamma assamense**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 318 & 319.

☿. Black, with a very sparse, short, erect pilosity and very minute but abundant pale pubescence, giving the insect a dull yellowish appearance. Head elongate, oval, slightly narrower posteriorly than in front; mandibles broad, longitudinally striate as in *D. scalpratum*, irregularly dentate; clypeus tectiform, subcarinate down the middle, the median lobe angular at apex; antennæ sparsely pilose, 2nd and 3rd joints of the flagellum subequal; head above coarsely but regularly longitudinally striate. Thorax and legs much as in *D. scalpratum*, but the pronotum longitudinally striate and the mesonotum not well defined; node of the pedicel flat on the sides, truncate posteriorly and strongly arched from back to front, about as long as broad posteriorly. Nodal spines longer and stouter than in any other Indian species, pointing backwards, the whole surface of the node covered with coarse but regular concentric striæ; abdomen short, massive, the basal segment coarsely striate, the striæ arranged in regular concentric arches from back to front.

Fig. 41.
Thorax of
Diacamma assamense, ☿.

Length, ☿ 11–12 mm.

Hab. Assam (*Smythies*), Upper Burma, the Chindwin Valley, and hills east of Myitkyina (*Bingham*).

97. **Diacamma ceylonense**, *Emery, Rend. Acc. Sci. Bolog.* i. (1897), pp. 159 & 165, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 318, ☿.

☿. Closely resembles *D. sculptum*, Jerdon, but is slightly larger, very black, brilliant and shining. Head elongate, oval; mandibles castaneous red, finely striate, strongly dentate; clypeus convex, finely longitudinally striate, the median lobe rounded at apex; head above the antennæ longitudinally striate, oblique on the side and on the front between the eyes. Thorax elongate, narrow; the pronotum with concentric striæ on the disc enclosing one or two transverse striæ; mesonotum not distinctly defined; metanotum with the striæ irregularly transverse on the disc, longitudinally oblique on the sides and transverse at the apex; legs long and stout. Node of the pedicel as in *D. sculptum*; abdomen very massive, the striæ on the basal abdominal segment longitudinal and outwardly divergent from front to back, 2nd segment with a zone of short longitudinal striæ in the middle, the base and apex broadly smooth.

Length, ☿ 12 mm.

Hab. Cochin (*Rothney*); Ceylon (*Nietner*).

I am not very certain about this species. Emery states that it

is densely pubescent. Unfortunately I have only seen one specimen which I can refer to this species, and in this the pubescence is not more but less dense than in *D. sculptum*.

98. **Diacamma sculptum**, *Jerdon* (Ponera), *Madr. Jour. Lit. & Sci.* xvii (1851), p. 117, ☿.
Diacamma rugosum*, *Forel* (nec *Le Guill.*), & D. geometricum, *Forel* (*nec Smith*), *Jour. Bomb. N. H. Soc.* xiii (1900), pp. 318, 319, 320, ☿.

☿. Black, with an erect, fine, pale scattered pilosity, and beneath it a fairly dense yellow sericeous pubescence. Head rounded posteriorly, a little longer than broad; mandibles dark castaneous red, sparingly punctured and with traces of effaced longitudinal striæ; clypeus opaque not striate, with a large rounded tubercle in the middle at base; the apex of the median lobe rounded; head and front above the clypeus longitudinally rather coarsely striate in the middle, obliquely striate at the sides and on the inner side of the orbits of the eyes. Thorax anteriorly nearly as wide as the head; the pronotum with one or two longitudinal striæ in the centre surrounded by concentric arched striæ from back to front; mesonotum distinctly defined, opaque, not striate; the metanotum with elongate looped concentric striæ from front to back, often not well defined on the sides; legs rather slender. Node of the pedicel very convex and rounded anteriorly, flat posteriorly, with somewhat irregular concentric striæ, about as long as broad posteriorly, the nodal spines suberect; abdomen rather short and massive, the basal segment above with concentric striæ arched from back to front.

Fig. 42.—*Diacamma sculptum.* Node of pedicel of ☿.

Length, ☿ 8–9 mm.

Hab. Sikhim (*Möller*); Barrackpore, Bengal (*Rothney*); Kanara; Mysore; Malabar, the Nilgiri hills (*Wroughton*); Cochin; Travancore (*Ferguson*); Ceylon (*Yerbury*).

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* Le Guillou's description of *Ponera rugosa* from Borneo (Ann. Soc. Ent. Fr. x, 1841, p. 318) is not detailed enough for identification of the form of *Diacamma* he had before him, but according to Messrs. Forel and Emery *D. rugosum*, Le Guill., = *D. versicolor*, Smith. The type of this latter, and also of *D. geometricum*, Smith, from Singapore, are in the British Museum Collection. They are quite different from anything I have seen from India, Burma, or Ceylon. Jerdon's *Ponera sculpta* was from Malabar. I identify with it the more robustly built of the two forms of *Diacamma* occurring in Western India. This, the slightly larger form, is recorded from Mysore, Malabar, Cochin and Travancore, besides other localities in Northern and Eastern India, and from Ceylon. On the contrary, the smaller slighter form which I identify as *D. vagans*, Smith, has not in Western India been recorded from any locality further south than Kanara.

After an examination of a very long series of this species I have not found a single individual, either in Mr. Wroughton's, Mr. Rothney's, the British Museum, or my own collections, from any locality in Assam, Burma, or Tenasserim. A few specimens from Sikhim have on the pronotum one or two transverse striæ in the middle surrounded by concentric striæ arched towards the front, in this resembling *D. vagans*, Smith. They can, however, be distinguished by the attenuate suberect nodal spines.

D. rugosum, var. *rothneyi*, Forel, is founded on specimens from Cochin in Mr. Rothney's collection. It is of an intense shining black, with the pubescence much more sparse.

99. **Diacamma vagans**, *Smith* (Ponera), *Jour. Linn. Soc.* v (1861), p. 103, ☿.

☿. Black, with a beautiful greenish-bronzy tint, the mandibles, the base and apex of the scape of the antennæ and the legs castaneous red, the latter varying sometimes to reddish brown, the apical margins of the abdominal segments and the whole apical segment testaceous. Head, thorax and abdomen covered rather sparingly with short erect reddish hairs; pubescence moderate, sometimes very dense, of a pale yellow colour, fine and sericeous. Head oval, proportionately longer than in any other species; mandibles punctured, strongly dentate; clypeus convex, tectiform, opaque not striate, the median lobe rounded at apex; head above the antennæ generally more or less deeply and regularly striate, the striæ longitudinal in the middle, oblique on the sides and on the inner side of the eyes. Thorax slender and elongate; pronotum with from one to four transverse striæ, surrounded by concentric striæ; mesonotum distinct, with shallow punctures; metanotum striate, the striæ running obliquely forwards from a medial impressed line more or less marked in all specimens; legs long, rather robust. Node of the pedicel concentrically striate, proportionately shorter than in *D. sculptum*, with a more gradual anterior slope, truncate posteriorly, spines thick, variable in length; abdomen proportionately narrower and elongate, the striæ on the basal abdominal segment variable, in certain specimens distinct, concentric, arched from back to front, in others almost effaced.

Fig. 43.—*Diacamma vagans*. Node of pedicel of ☿.

♂. With the characters as shown under the genus. Black; the mandibles, antennæ and legs reddish brown, the apical 3 or 4 abdominal segments testaceous.

Length, ☿ 8–9·5; ♂ 13; wing 9 mm.

Hab. Sikhim (*Möller*); Calcutta (*Rothney*); Orissa; Bombay;

Kanara (*Wroughton*); Ceylon; Assam; Burma; Tenasserim (*Bingham*), extending to the Malayan subregion. Described originally from Batchian.

The type is in the British Museum Collection.

Var. *burmanum*, Emery, has a few partially obsolete longitudinal striæ in the middle of the 2nd abdominal segment.

Genus ECTATOMMA.

Ponera, pt., *Smith, Jour. Linn. Soc.* ii (1857), p. 66, ☿.
Ectatomma, *Smith, Cat.* vi (1858), p. 102, pl. 7.
Stictoponera (subgen.), *Mayr, Verh. zool.-bot. Ges. Wien,* xxxvii (1887), p. 539, ☿.

Type, *E. tuberculatum*, Oliv., from Brazil. Of the subgenus *Stictoponera*, *E. coxale*, Roger, from Ceylon.

Range. Both hemispheres. Of the subgenus, the Indo-Malayan region.

☿. Head oval; mandibles triangular, the masticatory margin broad, dentate; clypeus triangular, the apex of the triangle reaching half the way up between the antennal carinæ, which are straight, short, only slightly laminate anteriorly; antennæ 12-jointed, filiform, the scape and the flagellum only slightly incrassate towards their apices; head posteriorly deeply emarginate, the posterior lateral angles acutely produced. Eyes of moderate size. Thorax short, broad, convex above, rounded anteriorly, slightly compressed posteriorly, and with the apex somewhat concave; the pro-meso- and meso-metanotal sutures not very distinct above; legs short, somewhat slight, the posterior coxæ armed with a spine, the femora and tibiæ cylindrical, claws simple. Pedicel one-jointed, cylindrical, thick, constricted anteriorly and posteriorly, not nodiform, dentate beneath; abdomen oval, short and comparatively broad. The head, thorax and base of abdomen always coarsely rugose-punctate; the punctures sometimes confluent and forming longitudinal ridges.

The four species found in our limits belong to the subgenus *Stictoponera*, Mayr; the generic characters given above apply, strictly, only to the species of the subgenus.

Key to the Species.

a. Clypeus with a medial longitudinal groove.
 a'. Eyes placed at the sides of the head; the distance between the eyes and the base of the mandibles greater than between the eyes and the top of the head ...... *E. bicolor*, p. 83.
 b'. Eyes placed a little more forward; the distance between the eyes and the base of the mandibles about equal to that between the eyes and the top of the head .... *E. binghami*, p. 83.

b. Clypeus without a medial longitudinal groove.
a'. Second abdominal segment longitudinally coarsely rugose-striate, no smooth polished area in the middle of the segment above . . . . *E. costatum*, p. 83.
b'. Second abdominal segment coarsely and comparatively sparsely punctured, smooth in the middle of the segment above . . . . *E. coxale*, p. 84.

100. **Ectatomma bicolor**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 493, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 316, ☿.

☿. Head, thorax, legs and pedicel ferruginous red; abdomen jet-black: the head, thorax, pedicel and basal abdominal segment coarsely punctate, the punctures confluent on the thorax above and forming short longitudinal furrows bounded by sharp carinated striæ; the legs, the 2nd and following segments of the abdomen smooth, a few coarse punctures on the sides of the 2nd segment at base; the head, thorax and abdomen covered with scattered erect hairs. Head broader posteriorly than in front, the mandibles obscurely and finely longitudinally striate; clypeus slightly convex, rounded anteriorly; antennal carinæ wide apart; antennæ with the 1st joint of the flagellum longer than the 2nd. Thorax about the length of the abdomen, short, broad, arched above, the apical face of the metanotum feebly denticulate; legs moderately long, pubescent, the spine on the posterior coxæ pointing obliquely outwards. Pedicel longer than broad, slightly attenuated anteriorly; abdomen curved, its apex testaceous.

Length, ☿ 5·5–6 mm.

Hab. Assam (*Long*); Burma; Tenasserim (*Fea & Bingham*); extending to China and the Malay Peninsula.

Var. *minor*, Forel, is smaller and devoid of the denticulations on the metanotum.

101. **Ectatomma binghami**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 316 & 317, ☿.

☿. Closely resembles *E. bicolor*, Emery, of which it seems to be little more than a local variety. Besides the slight difference in the position of the eyes (see key to the species), the medial furrow on the clypeus is shorter and not shining but opaque, the head posteriorly is not so deeply emarginate, and the flagellum of the antennæ is comparatively thicker.

Length, ☿ 4–4·5 mm.

Hab. Lower Burma, the Pegu Yoma (*Allan*).

102. **Ectatomma costatum**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 494, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 316, ☿.

☿. Ferruginous red, the mandibles, antennæ and legs somewhat lighter in colour than the head, thorax and abdomen, these latter closely and coarsely rugose-striate, except the 3rd and

succeeding segments of the abdomen; pilosity short, erect, pale reddish and fairly abundant; pubescence minute, only apparent in certain lights. Head a little broader posteriorly than in front, emarginate, but not so deeply as in *E. bicolor*; mandibles shining, obsoletely longitudinally striate, the masticatory margin very broad; clypeus coarsely longitudinally strigate. Thorax as in *E. bicolor*. Pedicel as broad as long or broader, more steeply sloped posteriorly than in front; abdomen comparatively longer than in *E. bicolor*, the whole of the 2nd segment as coarsely rugose-striate as the 1st.

Length, ☿ 7–7·5 mm.

Hab. Tenasserim (*Fea*).

103. **Ectatomma coxale**, *Roger* (Ponera), *Berl. ent. Zeit.* iv (1860), p. 308, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 316, ☿

☿. Dark ferruginous brown, the abdomen piceous; the mandibles, head, thorax, pedicel and base and sides of the 1st abdominal segment coarsely punctured, cribrate; 2nd and following segments of the abdomen smooth, highly polished and shining; pilosity and pubescence extremely sparse, almost entirely wanting; mandibles not so broad as in *E. costatum*, punctured and bearing delicate longitudinal striæ between the punctures; the clypeus almost transverse anteriorly, the portion produced back between the antennal carinæ rounded and depressed: antennæ slighter than in either *E. bicolor* or *E. costatum*, the middle joints of the flagellum a little longer than broad. Thorax: the pronotum broad in front, the anterior margin curved, the lateral angles somewhat prominent; legs rather robust, smooth and shining.

Fig. 44.—*Ectatomma coxale*, ☿.
a. Posterior leg.

Pedicel from above slightly longer than broad, posteriorly slightly constricted, rounded and convex in front; abdomen short and somewhat massive.

Length, ☿ 6·5 mm.

Hab. Ceylon (*Yerbury*, *Green*, *Wickwar*); extending to Borneo and through the Indo-Malayan subregion.

I procured a single specimen at Kandy, which I identified with Smith's *Ponera rugosa* = *E. coxale*, Roger, apud Emery & Dalla Torre.

Genus ECTOMOMYRMEX.

Pachycondyla, pt., *Smith, Cat.* vi (1858), p. 107, ☿.
Ectomomyrmex, *Mayr, Tijds. v. Ent.* x (1867), p. 83, ☿ ♀.

Type, *E. javanus*, Mayr, from Java.

Range. The Indo-Malayan region.

☿. Head depressed and somewhat flat, emarginate posteriorly, with the outline of the sides of the head from front arched, the cheeks flat, submargined; mandibles broadly triangular, the masticatory margin dentate, the apical tooth long, acute and slightly

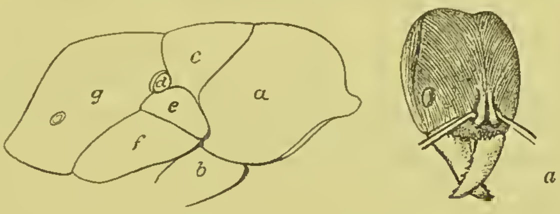

Fig. 45.—*Ectomomyrmex*: thorax of ☿.
a. Head of *E. astutus*.

curved; clypeus narrow, transverse, but acutely produced upwards in the middle to between the base of the antennæ; frontal area wanting: antennal carinæ somewhat close together, curved and anteriorly broadened into a triangular lamina covering the base of the antennæ; antennæ 12-jointed, long, cylindrical; flagellum slightly and gradually thickened towards the apex. Thorax short, rounded and convex above, posteriorly slightly compressed, the pro-mesonotal suture well marked and distinct, a wide distinct suture between the epimeron and episternum of the mesothorax; the meso-metanotal suture barely indicated above, the apex of the metanotum obliquely truncate, longitudinally lightly concave, the sides submargined; legs stout, the femora and tibiæ cylindrical; pedicel one-jointed. Node of pedicel high, on a level with the thorax, very convex and rounded in front, fitting the hollow in the apical face of the metanotum; posteriorly the node is somewhat flat and bevelled off towards its upper margin; abdomen massive, elongate, truncate anteriorly, the basal two segments equal in length, the constriction between them moderately well marked.

Five species of the genus are known from within our limits. Of these one, *E. leeuwenhoeki*, Forel, is slightly aberrant, the node of the pedicel being different in shape from that of the others.

Key to the Species.

A. Node of the pedicel convex in front; the upper portion of the posterior face bevelled off towards the front.	
a. Length over 9 mm.	
a'. Abdomen finely and closely punctured, opaque, not shining	*E. astutus*, p. 86.
b'. Abdomen smooth, highly polished and shining.	
*a*². Mandibles with 10 or 11 small teeth.	*E. javanus*, p. 86.
*b*². Mandibles with only 7 comparatively large teeth	*E. maternus*, p. 87.
b. Length under 6 mm.	*E. annamitus*, p. 87.
B. Node of the pedicel not bevelled, flat and truncate anteriorly and posteriorly	*E. leeuwenhoeki*, p. 88.

104. **Ectomomyrmex astutus**, *Smith* (Pachychondyla), *Cat.* vi (1858), p. 107, ☿.
Ectomomyrmex sundaicus, *Mayr, Tijds. v. Ent.* x (1867), p. 85, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 321, ☿.

☿. Black, the mandibles and the tibiæ and tarsi of the legs deep castaneous red; the head, thorax and abdomen covered with short erect reddish-yellow hairs and a fine thin sericeous recumbent pubescence, visible only in certain lights. Head very finely and closely striate, the striæ diverging posteriorly from a medial line; the emarginate portion of the occiput smooth and shining, with a few oblique striæ in the middle; the lateral angles of the head acute. Thorax: the pronotum convex above, narrowed anteriorly into a neck, closely finely striate, the striæ concentric; meso- and metanotum somewhat more coarsely longitudinally striate, the basal portion of the metanotum short, not longer than the apical sloping portion, the latter seen from the back subcordate in shape, widening in the middle, finely longitudinally striate; legs moderately long, robust. Node of the pedicel rugose above, transverse, striate in front; abdomen very finely and closely punctured, opaque, and bearing scattered piligerous points, the apical margins of the 2nd and succeeding segment very narrow and obscurely reddish.

Length, ☿ 12·5–13 mm.

Hab. Assam (*Smythies*); Burma; Tenasserim (*Fea & Bingham*); extending to Australia.

I have compared specimens of *E. sundaicus*, Mayr, named by Dr. Forel, with the type of *Pachychondyla astuta*, Smith, in the British Museum, and there cannot be the shadow of a doubt as to their identity.

105. **Ectomomyrmex javanus**, *Mayr, Tijds. v. Ent.* x (1867), p. 84, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 321 & 322, ☿.

☿. Resembles *E. sundaicus*, but is smaller, with the sculpture of the thorax and abdomen different. Black; the mandibles, antennæ and legs, except the anterior and intermediate coxæ,

chestnut-red. Pilosity and pubescence as in *E. sundaicus*, but a little more dense. Head shorter and broader proportionately but similarly sculptured. Thorax with the pronotum rather strongly concave and transversely striate; the rest of the thorax longitudinally striate, except the posterior sloping face of the metanotum which is shaped as in *E. sundaicus*, but is transversely not longitudinally striate; legs with the femora and tibiæ cylindrical. Node of the pedicel posteriorly shining along the margins, transversely striate in the middle; abdomen but for the pubescence highly polished, smooth and shining.

♀. Similar, larger, with a more massive thorax and abdomen; the mesonotum and scutellum broad and somewhat flat; the pro- and mesonotum and scutellum longitudinally striate, the metanotum somewhat more coarsely and concentrically striate.

Length, ☿ 9–11; ♀ 13 mm.

Hab. Assam (*Long*); Burma (*Allan*); Tenasserim (*Bingham*); China, extending to the Malayan subregion.

106. **Ectomomyrmex maternus**, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 321 & 322, ☿.

☿. Closely resembles *E. javanus*, but is slightly smaller and more slender; the pronotum is not nearly so convex, and has the striæ concentric and not transverse. Black; the mandibles, antennæ, and legs reddish brown, of a lighter colour than in *E. javanus*.

Length, ☿ 8·5–9 mm.

Hab. Assam (*Smythies*); Burma, Maymyo, 3000 ft. (*Bingham*).

Dr. Forel considers this as merely a local race of *E. javanus*, Mayr. It is very closely allied, but the depressed pronotum with the different sculpture and the coarsely dentate mandibles, as indicated in the key, seem to be constant characters.

107. **Ectomomyrmex annamitus**, *André* (Ponera), *Rev. d'Ent.* xi (1892), p. 48; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 321 & 322.

☿. Black; the mandibles, antennæ, femora, tibiæ and tarsi of the legs and apex of the abdomen castaneous red. Head, thorax and abdomen with fairly abundant erect pale red hairs, covered by a minute sericeous pubescence, only visible in certain lights and in no way obscuring the sculpture. Head proportionately more elongate than in *E. javanus*, posteriorly less deeply emarginate, very densely and somewhat coarsely reticulate-punctate, the occiput smooth and shining; mandibles longer, with the masticatory region not so broad, armed with 7 teeth. Thorax nearly as broad anteriorly as the head, densely and somewhat more finely reticulate-punctate, coarsely rugose towards the apex of the basal portion of the metanotum; legs proportionately shorter, somewhat stouter. Node of the pedicel very thick, coarsely rugose above, and with coarse concentric striæ on its

posterior face, which is slightly concave; abdomen slightly shining, finely and closely punctured, but not granulate as the head and thorax are.

♀. "Head truncate posteriorly and on the posterior half of its sides. Back of the thorax depressed, the pronotum forming nearly one-third of its entire length. Node of the pedicel as in the ☿. The apical sloping portion of the metanotum with beautiful arched striæ, concave above, strongly marked and regular. Posterior face of the node of pedicel striated in the same way, but the striæ convex above. The circumference of the node of pedicel transversely ridged; its anterior face strongly striate, the striæ arched and convex above as on the posterior face. Head and thorax and the anterior three-fourths of the basal abdominal segment densely reticulate-punctate, opaque. Wings lightly shaded with brown, the nervures and stigma brown. Pilosity and pubescence short and reddish, moderate, somewhat abundant on the abdomen. The rest as in the ☿. Black, with the antennæ, mandibles, legs and apex of the abdomen reddish." (*Forel.*)

Length, ☿ 3–6; ♀ 6·3 mm.

Hab. India (*Ind. Mus.*), Calicut (*Rothney*); Burma (*Fea, Bingham*); Annam (*apud André*).

108. **Ectomomyrmex leeuwenhoeki**, *Forel* (Ponera), *Jour. As. Soc. Beng.* lv (1886), p. 244, ☿; *id. Jour. Bomb. N. H. Soc.* xiii (1900), p. 321, ☿.

☿. Black; the mandibles, antennæ and the femora, tibiæ and tarsi of the legs brownish red, the scape and the femora shaded above with fuscous. Head, thorax and abdomen covered rather sparsely with short erect red hairs and with a minute pubescence, visible only in certain lights. Head proportionately not so long as in *E. annamitus*, coarsely longitudinally striate, very opaque; the emarginate posterior face of the occiput with a few coarse oblique striæ. Thorax coarsely striate, the striæ on the pronotum concentric, arched anteriorly, on the posterior portion longitudinal but irregular, giving the metanotum a coarsely rugose appearance; posterior face of the latter slightly concave, transversely striate; legs robust, pruinose. Node of the pedicel remarkably thick above, coarsely punctured and rugose, its posterior face with a few transverse striæ in the middle; abdomen with the basal segment coarsely, the remaining segments shining and finely punctured.

Length, ☿ 7–8 mm.

Hab. India (*Ind. Mus.*), Calicut (*Rothney*); Assam (*Wood-Mason*); Burma (*Fea*); Tenasserim (*Bingham*).

Genus PONERA.

Formica, pt., *Fabr. Mant. Ins.* i, 1787, p. 309, ♂.
Ponera, *Latr. Nouv. Dict. d'Hist. Nat.* xxiv (1804), p. 179.

Type, *P. coarctata*, Latr., from Europe.
Range. Both hemispheres.

☿. Head without the mandibles broadly oval, broader posteriorly than in front, the sides convex; mandibles triangular, with a broad dentate masticatory margin; clypeus narrow, produced posteriorly into an angle between the antennal carinæ, its anterior margin transverse; antennal carinæ short, laminate anteriorly, covering the base of the antennæ; antennæ 12-jointed, flagellum clavate, the 1st joint of the latter very much longer and thicker than the 2nd joint; eyes minute or wanting, ocelli wanting. Thorax narrower than the head, convex above, the pro-meso- and meso-metanotal sutures distinct above, but the latter not emarginate, nor the metanotum depressed below the level of the pro- and mesonotum, nor compressed, but truncate posteriorly; legs moderately long and stout. Pedicel one-jointed; node somewhat thick, flat, or slightly convex in front, rounded above, vertically truncate posteriorly; abdomen comparatively massive, and as long as the thorax.

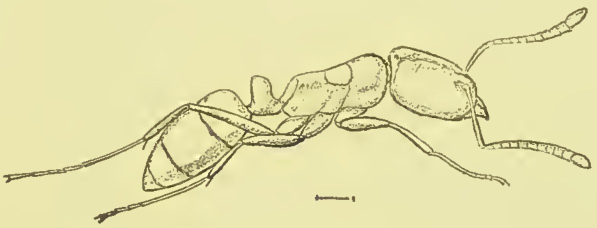

Fig. 46.—*Ponera coarctata*, ☿.

♂. Very similar to the ☿; eyes larger; ocelli present; pronotum forming part of the dorsum of the thorax; mesonotum of moderate size, rounded, convex; metanotum short, posteriorly truncate; legs, node of the pedicel, and abdomen similar to those of the ☿.

I have followed Prof. Emery in restricting the genus *Ponera* to the smaller species resembling the type, *P. coarctata*, in the shape of the thorax.

Key to the Species.

A. ☿ entirely blind .... *P. ceylonensis*, p. 90.
B. ☿ possessing more or less minute eyes.
  a. Dark castaneous brown; thorax above distinctly rounded and convex, not flat or depressed .... *P. truncata*, p. 90.
  b. Light testaceous yellow; thorax above distinctly flat and depressed.
    a'. Flagellum of antennæ much thickened towards apex; penultimate joints twice as broad as long .... *P. gleadowi*, p. 91.
    b'. Flagellum of antennæ not so much thickened towards apex; penultimate joints longer or as long as broad...... *P. confinis*, p. 91.

109. **Ponera ceylonensis**, *Mayr, Termesz. Füzetek*, xx (1897), p. 422, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 322, ☿.

"☿. Reddish yellow, in parts more brownish, the abdomen light brown; the mandibles, antennæ and legs, and also the apex of the abdomen, yellow. Pilosity very sparse, the hairs long, fine and nearly erect; the pubescence relatively dense, long, fine and nearly recumbent. The head, pedicel and abdomen in part densely and finely punctured, and only moderately shining. The sides of the head, the thorax and the node of the pedicel above with scattered shallow fine punctures, and somewhat more polished and shining. The smooth, shining, only sparsely punctured mandible has a masticatory margin armed with 9 or 10 teeth, of which the anterior tooth is the largest, the posterior the smallest. The head is half as long again as broad, and is distinctly broader than the pronotum; its sides are feebly arched, only just at the posterior lateral angles are they bent more strongly inwards; the posterior margin of the head is widely, not deeply emarginate. . . . . Antennal carinæ short. Eyes and ocelli entirely absent. Pronotum broadest anteriorly, narrowed towards the apex of the metanotum. The dorsum of the thorax is not level from front to back, but a little depressed from the very distinct pro-mesonotal suture to the apex of the basal portion of the metanotum. . . . . Node of pedicel very thick; meso-metanotal suture not distinct above; the node about as long as it is broad posteriorly, . . . and as high as the front of the 1st abdominal segment. Node seen from above trapeziform. . . . The constriction between the basal two abdominal segments moderately well marked." (*Mayr.*)

Length, ☿ 2·6 mm.

Hab. Ceylon.

Unknown to me, but very distinct apparently by the entire absence of eyes or ocelli.

110. **Ponera truncata**, *Smith, Jour. Linn. Soc.* v (1861), p. 72, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 324, ☿.

☿. Dark castaneous brown, densely reticulate, punctate and pubescent; the mandibles, antennæ and legs pale reddish brown. Head nearly transverse posteriorly; eyes comparatively large; mandibles with an extremely broad masticatory margin; clypeus carinate, the carina bifurcate anteriorly. Thorax as long as the abdomen, above slightly emarginate at the meso-metanotal suture, the metanotum slightly compressed. Node of the pedicel flat, very much broader than long, but distinctly thick and rounded above, not with a sharp margin; abdomen with the constriction between the basal two segments well marked; sting exserted.

Length, ☿ 3–3·5 mm.

Hab. Upper Burma, the Shan plateau up to 6000 ft. (*Thompson*); Karennee (*Fea*). Described originally from the Celebes.

111. **Ponera confinis**, *Roger. Berl. ent. Zeit.* iv (1860), p. 284, ☿ : *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 325 & 327, ☿ ♀.
Ponera simillima, *Smith, Jour. Linn. Soc.* v (1861), p. 105, ☿.

☿. Testaceous yellow, somewhat shining, covered with a fine, thin, sericeous pale pubescence; the legs pale yellow. Head without the mandibles rectangular, longer than broad, widely but very slightly emarginate posteriorly; mandibles with the masticatory margin very broad; clypeus medially tuberculate; eyes very minute, placed just above the base of the mandibles. Thorax more or less depressed above, the pronotum broad and slightly convex, the mesonotum large, more than half the length of the pronotum, the pro-meso- and meso-metanotal sutures deeply marked: the basal portion of the metanotum very short, passing by a curve into the oblique apical portion. Node of the pedicel flat, broader than long, rounded above; abdomen cylindrical vertically, truncate anteriorly.

♀. "Absolutely resembles the ☿, head also shining. Wings slightly brownish, with the nervures and stigma somewhat paler."

Length, ☿ 3; ♀ 3·5 mm.

Hab. Bengal (*Rothney*); Western India (*Wroughton*); Kanara (*Aitken*); Ceylon (*Green*).

Var. *aitkeni*, Forel, differs in being somewhat slighter, with the node of the pedicel thinner; the head and thorax slightly more shining. Var. *wroughtoni*, Forel, is piceous in colour, with the mandibles, antennæ and legs yellowish brown, and the basal portion of the metanotum slightly more convex than in typical *P. confinis*.

112. **Ponera gleadowi**, *Forel, Mem. Acc. Bolog.* (5) v (1887), p. 60, ☿; *id. Jour. Bomb. N. H. Soc.* xiii (1900), pp. 325 & 327, ☿.

☿. Closely resembles *P. confinis*, Roger, in colour. The head is rectangular and proportionately longer, the eyes even smaller, placed just above the base of the mandibles; the antennæ more clavate; the thorax above more depressed; the basal portion of the metanotum rectangular, nearly square; the node of the pedicel is proportionately lower, much thicker, and flatter anteriorly and posteriorly.

Length, ☿ 2–2·5 mm.

Hab. Recorded from Dehra Dun (*Rogers*); Bengal (*Rothney*); Western India (*Wroughton*), Ceylon (*Yerbury*), and Burma (*Bingham*).

Genus PSEUDOPONERA.

Belonopelta, pt., *Forel, Ann. Soc. Ent. Belg.* xxxvii (1893), p. 460, ♀.
Pachychondyla, *subgen.* Pseudoponera, *Emery, Ann. Soc. Ent. Belg.* xlv (1901), p. 42.

Type, *P. amblyops*, Emery, from Burma.

Range. Indo-Malayan region.

☿. Head rectangular; mandibles long and narrow, obtusely triangular, the masticatory margin strongly dentate, about the

same length as the inner margin or a little longer, the apical tooth curved, acute; clypeus very narrow, with a short, square, slightly-produced median lobe, and having a median, very short carina or tubercle; antennal carinæ short, laminate, covering the bases of the antennæ; antennæ 12-jointed, the scape and flagellum slightly incrassate towards their apex; eyes small, placed rather to the front and well forward towards the anterior margin of the head; ocelli absent. Thorax broad, convex in front, compressed posteriorly, the pro-meso- and meso-metanotal sutures both distinct; the basal portion of the metanotum short, not longer than the apical portion, the latter obliquely truncate; legs short and stout, the intermediate and posterior tibiæ with paired calcaria, the anterior calcaria on all the tibiæ simple, the posterior pectinate; the tibiæ and the basal joint of the tarsi of intermediate legs studded with spines. Pedicel one-jointed, the node convex in front, concave posteriorly, viewed from the side cuneiform, thick at base, with a dentiform process beneath; abdomen rather massive, cylindrical, the basal segment anteriorly truncate, slightly concave, the constriction between the basal two segments not well marked.

Two species only of this genus are known from within our limits.

Key to the Species.

a. Mandibles with a distinct masticatory margin and 7 unequal teeth .... *P. darwini*, p. 93.
b. Mandibles with the masticatory margin not so distinct, and only 4 or 5 unequal teeth .... *P. amblyops*, p. 92.

113. **Pseudoponera amblyops**, *Emery* (Ponera), *Ann. Mus. Civ. Gen.* xxv (1887), p. 434, ☿; *id.* (Pachychondyla, *subgen.* Pseudoponera), *Ann. Soc. Ent. Belg.* xlv (1901), p. 42.
Belonopelta amblyops, *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 320.

☿. Somewhat silky brownish yellow all over, covered with fairly abundant erect pale hairs, and a fine sericeous golden

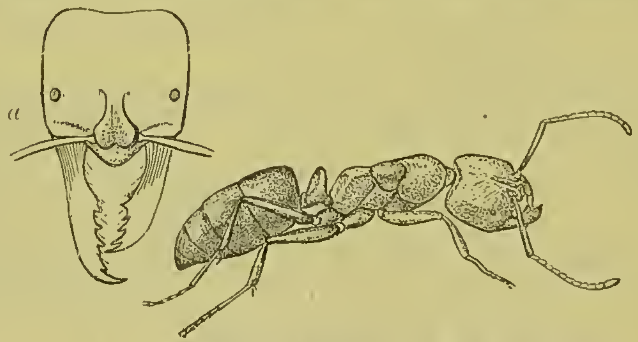

Fig. 47.—*Pseudoponera amblyops. a.* Head from front.

pubescence, dense on the front of the head and the antennæ and legs. Head and thorax very finely and densely punctured, opaque; node of the pedicel as finely but not so closely punctured,

somewhat shining. Head emarginate posteriorly; mandibles longitudinally striate; a distinct but very narrow and short impressed line vertically on the front between the antennal carinæ; eyes minute, concolorous with the surface of the head, not black. For the rest the characters of the genus.

♀. "Wings hyaline shaded with yellow: for the rest as in the ☿" (*Forel*).

Length, ☿ 6; ♀ 7 mm.

Hab. Sikhim (*Möller*); Assam (*Smythies*); through Burma and Tenasserim (*Fea*) to the Malay Peninsula.

114. **Pseudoponera darwini**, *Forel* (Belonopelta), *Ann. Soc. Ent. Belg.* xxxvii (1893), p. 460, ♀; *id.* (Belonopelta), *Jour. Bomb. N. H. Soc.* xiii (1900), p. 320.

♀. Brownish yellow all over, in some specimens darkening on the head and thorax; head, thorax and abdomen minutely and densely punctate, rugulose and subopaque; entirely covered with very fine short silky yellow pubescence, as in *P. amblyops* most conspicuous on the head in front; pilosity fairly abundant, long and soft towards the apex of the abdomen. Head without the mandibles rectangular, nearly square, slightly and broadly emarginate posteriorly, the sides slightly convex, the posterior and anterior margins about the same breadth; mandibles long, triangular, the masticatory margin armed with 7 teeth alternately large and small; clypeus with the median lobe shorter and less pronounced than in *P. amblyops*; eyes and ocelli large and conspicuous, the former nearly touching the bases of the mandibles. Thorax, legs, pedicel and abdomen with the characters as in the genus.

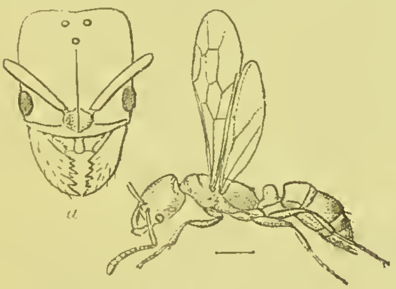

Fig. 48.—*Pseudoponera darwini*, ♀. *a.* Head.

Length, ♀ 4·5 mm.

Hab. Kanara (*Wroughton*); Ceylon (*Green*). Described originally from West Australia. Dr. Forel has separated the Indian species as var. *indica*. It differs from the type (Australian) by the shorter, squarer head. So far as I am aware, the ☿ is unknown.

Genus CENTROMYRMEX.

Ponera, pt., *Roger, Berlin. ent. Zeit.* v (1861), p. 5, ♀.
Centromyrmex, *Mayr, Verh. zool.-bot. Ges. Wien,* xvi (1866), p. 894, ☿.
Spalacomyrmex, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 489, ☿.

Type, *C. bohemanni*, Mayr, from Brazil.

Range. Central and Southern America, and Ceylon and Burma.

☿. Head without the mandibles rectangular or nearly square, a little broader posteriorly than in front; the frontal and occipital planes meeting at an acute angle, the occipital plane flat or slightly concave, the sides of the head slightly convex, with the lateral posterior angles distinct but rounded; mandibles elongate along the outer, very short along the inner side, making the masticatory margin remarkably broad, the apex of the mandibles curved backwards; antennæ 12-jointed, comparatively long and thick, the flagellum only slightly and gradually clavate towards the apex; antennal carinæ short, convergent posteriorly, expanded into laminæ over the base of the antennæ; eyes and ocelli absent. Thorax from above broad anteriorly, narrow and compressed posteriorly; the prothorax crescentic, anteriorly submargined, the sides and front vertical; mesonotum convex above, large, circular, the pro-mesonotal suture well marked, the meso-metanotal suture distinct on the sides of the thorax, less distinct above; metanotum saddle-shaped, the basal portion bluntly raised posteriorly, depressed in front, the apical portion obliquely and rather steeply sloped and lightly convex; legs short and stout; the femora thick, slightly compressed; the tibiæ cylindrical, the intermediate pair thickly spined on the upper side as in the fossorial genus *Scolia*; the tarsi broad and somewhat flat, thickly spined, the claws minute. Pedicel cubical, truncate anteriorly and posteriorly, its posterior face not applied very closely to the basal segment of the abdomen, as in *Myopopone* and *Stigmatomma*; abdomen elongately oval, anteriorly transverse.

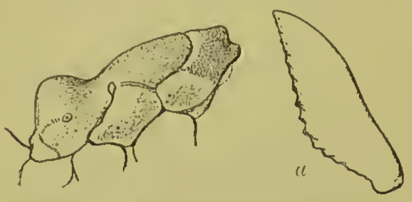

Fig. 49.—Thorax of ☿ *Centromyrmex*. *a*. Mandible.

♀. Similar, and also without eyes or ocelli.

"♂. Mandibles very short, triangular, without teeth. Antennæ short. Head rounded. Eyes of moderate size. Clypeus very convex. Thorax short and broad. Mesonotum large, with converging furrows. The metanotum strongly convex. Pedicel depressed, posteriorly with a node somewhat thin and emarginate above. Abdomen behind the basal segment only slightly constricted. Exterior genital valves triangular, broad, pointing downwards. Pygidium without points. Wings short, not reaching the end of the abdomen, hyaline, pubescent, . . . fore wing with 2 cubital, a closed radial, and a discoidal cell." (*Forel.*)

Only a few species of this singular and low form of ant are known. One only has been recorded from within our limits.

115. **Centromyrmex feæ**, *Emery* (Spalacomyrmex), *Ann. Mus. Civ. Gen.* xxvii (1889), p. 491, pl. 10, figs. 11–15, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 303, ☿.

☿. Entirely yellow, with a brownish or reddish tinge, covered

sparsely with short erect pale hairs, which are more densely set towards the apex of the abdomen beneath. Head, thorax and abdomen with the characters of the genus. Head posteriorly, the pro- and mesonotum rather sparingly but coarsely punctured; the mandibles, metanotum, coxæ, femora and tibiæ of the legs, node of pedicel, and abdomen smooth, polished, shining; the pronotum along the crescentic anterior margin with a broad but slight depression, which is finely wrinkled.

♀ (of var. *ceylonicus*). "Reddish, moderately pubescent. Shining. Head and thorax rather strongly punctured. Abdomen smooth but for the minute piligerous tubercles or points."

♂ (of var. *ceylonicus*). With the characters of the genus. "Head and thorax somewhat shining, irregularly sculptured, abdomen smooth. Pilosity brownish, rather abundant. Black. Legs and antennæ brown." (*Forel.*)

Length, ☿ 3·5–4; ♀ 4·5–5; ♂ 4·3 mm.

Hab. Burma (*Fea*); Ceylon (*Yerbury*).

Dr. Forel has separated the Ceylon form as var. *ceylonicus*, "distinguished by its smaller size, by its mandibles almost without teeth on their masticatory margin, by its slightly shorter and thicker antennæ, and by the node of the pedicel, which is much more transverse and squamiform, twice as broad as long (in *C. feæ* it is only one and a half times as broad as long)."

Genus BOTHROPONERA.

Ponera, pt., *Jerdon, Madr. Jour. Lit. & Sc.* xvii (1851), p. 119.
Pachychondyla, pt., *Smith, Cat.* vi (1858), p. 106.
Bothroponera, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 717.

Type. *B. pumicosa*, Roger, from South Africa.

Range. Ethiopian, Indo-Malayan and Australian regions.

☿. Head without the mandibles quadrangular; mandibles broad, triangular, the masticatory margin equal to the inner margin and armed with 7 or 8 teeth; clypeus transverse, produced backwards in an angle between the antennal carinæ, arched anteriorly; antennal carinæ rather short, broadened and laminate below, covering the base of the antennæ; antennæ 12-jointed, the flagellum gradually thickening towards the apex; eyes moderately large, placed at the sides, a little in front of the middle line of the head. Thorax comparatively broad, rounded above, the metanotum obliquely truncate at apex; the pro-mesonotal suture well marked, the meso-metanotal suture more or less obsolete above, entirely so in all Indian species; legs moderately long and stout, femora and tibiæ cylindrical, claws simple. Pedicel one-jointed; node at least as high as the metanotum, seen from the front oval or rounded, either flat anteriorly and posteriorly, or gently convex in front, concave posteriorly; abdomen massive, the constriction between the basal two segments well marked; sting powerful, exserted.

Key to the Species.

a. Posterior margin of node of pedicel armed with a number of blunt processes.
  a'. Metanotum unarmed .... *B. rufipes*, p. 96.
  b'. Metanotum armed with a blunt tooth or spine on each side .... *B. bispinosa*, p. 97.
b. Node of pedicel simple, unarmed.
  a'. 1st joint of flagellum of antennæ equal to, not longer than, 2nd joint. Length 6·5–7 mm. .... *B. tesserinoda*, p. 97.
  b'. 1st joint of flagellum of antennæ distinctly longer than 2nd.
    *a*². Length 8–12 mm.................... *B. sulcata*, p. 98.
    *b*². Length 5 mm. .... *B. rubiginosa*, p. 99.

116. **Bothroponera rufipes**, *Jerdon* (Ponera), *Madr. Jour. Lit. & Sci.* xvii (1851), p. 119, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 323, ☿.

☿. Dull black; the mandibles, antennæ and legs castaneous red, the apical two or three abdominal segments bright ferruginous; the whole insect covered with an abundant pale reddish-yellow pilosity. Head, thorax and node of the pedicel in front coarsely punctured, cribrate; the basal two abdominal segments rugose with remarkably coarse longitudinal ridges, the intervals between them coarsely punctured; the apical segments finely punctured, the yellowish-red hair on them long and thick. Mandibles

Fig. 50.—*Bothroponera rufipes*, ☿. *a*. Thorax.

obsoletely, finely, longitudinally striate and marked with some coarse shallow punctures, the teeth on the masticatory margin often worn and obsolete; clypeus with a medial, often ill-defined, short carina at base; antennæ densely pubescent, finely rugulose, opaque; eyes comparatively small; occiput slightly emarginate, the anterior border of the emargination and the posterior lateral

angles of the head rounded. Thorax massive, as broad in front as the head, convex; the apical truncated face of the metanotum concave, smooth and shining, and strongly margined above and on the sides; legs opaque, densely pilose and pubescent. Node of the pedicel about twice as broad as long, convex and rounded above, the spinous processes on the posterior margin above irregular, not very acute; the posterior face of the node deeply concave, smooth and shining; abdomen very massive, cylindrical, the constriction between the basal two segments well marked.

Length, ☿ 13–15 mm.

Hab. Himalayas from the Siwaliks to Assam, and up to 4000 ft. (*Smythies*); Bengal (*Rothney*); Western India, Kanara to Malabar (*Wroughton*): Ceylon, Kandy (*Yerbury*); and throughout Burma and Tenasserim (*Bingham*).

117. **Bothroponera bispinosa**, *Smith* (Pachychondyla), *Cat.* vi, 1858, p. 107, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 323 & 326, ☿.

☿. In colour and sculpture entirely resembling *B. rufipes*, Jerdon, but larger, and the metanotum armed on each side at the

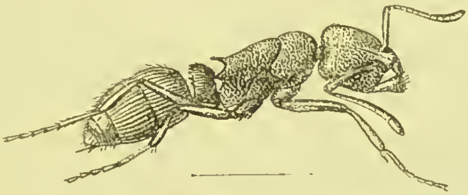

Fig. 51.—*Bothroponera bispinosa*, ☿.

posterior end of the basal portion with a subtriangular flat blunt spine pointing backwards and upwards.

Length, ☿ 16–18 mm.

Hab. Recorded from the Siwaliks (*Rogers*); Assam (*Smythies*); Burma, Maymyo, 3000 ft., Katha (*Bingham*); Tenasserim (*Hodgson*), Karen hills (*Fea*).

This species and *B. rufipes* when picked up or disturbed emit a thick white frothy liquid from their mouths with an overpowering smell of formic acid.

It has been suggested, I believe by Professor Emery, that the ☿ of *B. rufipes* is dimorphic, and that *B. bispinosa* is one of the forms. I may mention that I found two nests at Maymyo, not 10 yards from one another, one of which contained all *B. rufipes*, the other all *B. bispinosa*. Both nests were under fallen trees. I found no winged form in either nest.

118. **Bothroponera tesserinoda**, *Mayr* (Ponera), *Verh. zool.-bot. Ges. Wien*, xxviii (1878), pp. 661 & 663, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 323 & 325, ☿ ♂.

☿. Dull black, subopaque or slightly shining; mandibles, antennæ and legs castaneous red, the scape of the antennæ, the

coxæ and femora of the legs slightly fuscous, the apical three abdominal segments more or less testaceous yellow; head, thorax and abdomen with very short, sparse, erect pale hairs, and a fairly dense silky pale yellow pubescence, which gives a dull opaque appearance to the whole insect but does not hide the sculpture; the latter consists of scattered rather shallow punctures, and more or less piligerous points; the punctures are most distinct on the node of the pedicel. Head longer than broad; mandibles punctured, not striate; clypeus transverse, slightly convex, not carinate; antennæ massive; head posteriorly widely and very slightly emarginate. Thorax not so broad as the head, the pronotum convex, the metanotum slightly compressed, rounded above, the truncated apical face flat, not margined. Node of the pedicel thick, about as long as broad posteriorly, slightly narrowing to the front, truncate anteriorly and posteriorly; abdomen massive, cylindrical.

"♂. Head slightly more elongate and eyes slightly nearer the base than in *B. sulcata*. Pubescence more dense. More shining. Apical face of the metanotum a little more distinct. Wings barely tinged with yellow. The pronotum extending a little in front of the mesonotum; the mesonotal convergent furrows indistinct. hypopygium not emarginate. The rest as in *B. sulcata*." (*Forel.*)

Length, ☿ 6·5–7; ♂ 5·5–6 mm.

Hab. From Dehra Dun to Cochin (*Rothney*); Ceylon (*Yerbury*); Assam (*Smythies*); Burma and Tenasserim (*Fea & Bingham*).

119. **Bothroponera sulcata**, *Frauenf.* (Ponera) *Verh. zool.-bot. Ges Wien*, xvii (1867), p. 441, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), pp. 323 & 326, ☿ ♂.

☿. Dull black; the mandibles, flagellum of the antennæ, tibiæ of the legs towards the apex and tarsi castaneous red; the scape of the antennæ, the femora and base of the tibiæ fuscous. Head, thorax and abdomen minutely and closely reticulate-punctate, with scattered piligerous shallow punctures, covered all over with fairly abundant long erect pale hairs and a dense fine sericeous pubescence. Head without the mandibles a little longer than broad, slightly emarginate posteriorly; mandibles smooth and shining, with a few scattered punctures, clypeus convex in the middle and subcarinate. Thorax convex, rounded above, not so broad as the head, narrowing towards the apex which is truncate, but more obliquely sloping than in *B. tesserinoda*; legs comparatively short, densely pubescent and pilose. Node of the pedicel thick, about as long as broad, comparatively flat and truncate anteriorly and posteriorly, greatly rounded and convex above; abdomen massive, cylindrical.

"♂. Maxillary palpi 6-, labial palpi 4-jointed. Mandibles rudimentary, rectangular, thin and flat, very far from meeting in the middle. Antennæ long; scape very short, one and a half times as long as broad. Head oval, large; eyes and ocelli large. Pronotum vertical, not extending in front of the mesonotum. The latter with two converging furrows. Pedicel surmounted by a

high and very thick node, a little broader than long, subtruncate anteriorly and posteriorly, and rounded above. Abdomen elongate and narrow, constricted after the first segment. Pygidium with a long curved point. Hypopygium nearly flat, emarginate at apex. Exterior genital valves rounded, rather small. Thorax somewhat massive. The whole insect opaque, finely punctured; wings feebly tinged with yellow and pubescent." (*Forel.*)

Length, ☿ 8–11·5; ♂ 10–10·5 mm.

Hab. N.W.P. India (*Smythies*); Bengal (*Rothney*); Central India (*Schurr*); and Western India (*Wroughton*).

Dr. Forel has described two varieties under the names *sulcato-tesserinoda* and *fossulata*. The former has characters intermediate between *B. sulcata* and *B. tesserinoda*; and the latter differs from typical *B. sulcata* in having the posterior half of the head with scattered large shallow punctures.

120. **Bothroponera rubiginosa,** *Emery* (Ponera), *Mus. Civ. Gen.* xxvii (1889), p. 498, ☿; *Forel, Jour. Bomb. N. H. Soc.* xiii (1900), p. 323, ☿.

☿. Dull opaque black, the mandibles, antennæ and legs light red, the posterior margins of the abdominal segments and the pygidium reddish yellow. Head, thorax and abdomen finely, very closely reticulate-punctate, covered with a fine sericeous hoary pubescence; the abdomen slightly shining. Head, without the mandibles, a little longer than broad, posteriorly widely emarginate, the posterior lateral angles well defined but not produced; mandibles opaque, punctured; clypeus transverse, medially somewhat sharply carinate. Thorax short, shorter than the abdomen, massive, convex in front, rounded above, the obliquely truncate apex of the metanotum almost submargined; legs stout, densely pubescent. Node of the pedicel a little broader than long, rounded above, and somewhat roundly truncate anteriorly, posteriorly abruptly truncate, vertical and flat; abdomen cylindrical, long and massive.

Length, ☿ 5 mm.

Hab. Western India, Poona (*Wroughton*); throughout Burma and Tenasserim (*Bingham*).

Genus **MESOPONERA.**

Ponera, pt., *Smith, Cat.* vi (1858), p. 91.
Pachychondyla, pt., *Mayr, Verh. zool.-bot. Ges. Wien*, xvi (1866), p. 890, ☿.
Mesoponera, *Emery* (Euponera, *For.*, Subgen. Mesoponera, *Emery*), *Ann. Soc. Ent. Belg.* xlv (1901), p. 43.

Type, *M. caffraria*, Smith, from S. Africa.

Range. Both hemispheres.

☿. Head without the mandibles rectangular, longer than broad, and broader posteriorly than in front; mandibles strong, triangular,

with a very broad dentate masticatory margin; clypeus narrow, transverse, produced back to an angle between the antennal carinæ, and carinate down the middle, the anterior margin transverse; antennal carinæ short, broadly laminate in front, covering the base of the antennæ; antennæ 12-jointed, only slightly clavate towards the apex, the basal two joints of the flagellum subequal; eyes larger in proportion than in the genus *Ponera*. Thorax: the pronotum broad, convex; the mesonotum prominent, more or less gibbous, the pro-meso- and meso-metanotal sutures well marked; the metanotum tectiform, pinched, and more or less acute along its basal portion above (more so in the sole Indian species than in the type of the genus), the apex obliquely truncate posteriorly; viewed from the back the apical face is subtriangular; legs stout, moderately long, the basal joint of the tarsus in the posterior legs longer than the tibiæ. Pedicel one-jointed, node of various shapes; abdomen short, cylindrical.

♀. Very similar to the ☿; pronotum only slightly depressed, forming part of the dorsum of the thorax; mesonotum short, flat, with a U-shaped impressed line; scutellum and postscutellum slightly gibbous; metanotum short, the basal portion much shorter than the apical truncate portion; legs, node of the pedicel and abdomen as in the ☿.

121. **Mesoponera melanaria**, *Emery* (Ponera), *Ann. Soc. Ent. Fr.* 1893, p. 260, footnote, ☿; *Forel* (Ponera), *Jour. Bomb. N. H. Soc.* xiii (1900), p. 323, ☿.

☿. Dark castaneous brown, smooth and somewhat shining; the mandibles, antennæ and legs much lighter, inclining to reddish. Pilosity almost absent, confined to a few erect somewhat long hairs on the clypeus and mandibles, and on the apex of and beneath the abdomen. Head with the cheeks somewhat flattened, the

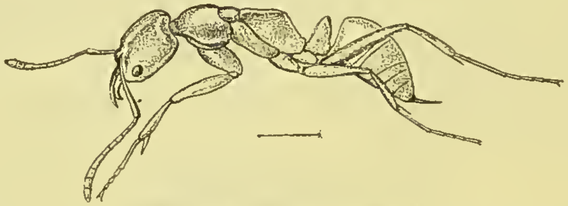

Fig. 52.—*Mesoponera melanaria*, ☿.

posterior lateral angles rounded, not prominent, as broad in front as posteriorly. Node of the pedicel very convex in front, flat, almost concave, posteriorly, not so broad at the apex as at base. For the rest the characters of the genus.

♀. Exactly similar to the ☿, lighter in colour, with the sex differences as noted under the generic characters.

Length, ☿ 7·5–8·5; ♀ 9 mm.

Hab. Western India (*Wroughton*); Ceylon (*Yerbury*); Lower Burma (*Bingham*).

Genus BRACHYPONERA.

Ponera, pt., *Smith, Jour. Linn. Soc.* v (1861), p. 103, ☿.
Pachychondyla, pt., *André, Rev. Ent.* ix (1890), p. 316, ♀.
Brachyponera, *Emery* (Euponera, *Forel,* Subgen. Brachyponera), *Ann. Soc. Ent. Belg.* xlv (1901), p. 43.

Type, *B. senaarensis*, Mayr, from Arabia.

Range. Ethiopian and Indo-Malayan regions.

☿. Closely resembles the ☿ of the genus *Ponera*, Latr., but in all the species the metanotum is strongly compressed and emarginate at the meso-metanotal suture, from thence broadening to the apex, the apical face very broad and shaped to allow of the anterior face of the node of the pedicel closing over it; the metanotum viewed from the side is seen to be distinctly lower than the anterior portion of the thorax. The sides of the head are flattened and the mesonotum gibbous as in *Mesoponera*: the eyes proportionately considerably larger than in *Ponera*, and placed higher up on the side of the head.

♀. Very similar to the ☿: larger. The pronotum about half the length of the mesonotum, forming part of the dorsum of the thorax in front; the scutellum gibbous, the metanotum similar to that in the ☿, but much shorter; the rest as in the ☿.

♂. The antennæ remarkably short, the thorax remarkably short and massive; the mandibles rudimentary; node of the pedicel laminate, wide: a very slight constriction between the basal two segments of the abdomen; pygidium rather short and obtuse at apex.

Key to the Species.

a. Joints of flagellum of antennæ, basal and apical excepted, as broad as long or broader. Length under 4 mm.
- *a'.* Scape of antennæ long, extending well beyond top of head .... *B. luteipes*, p. 101.
- *b'.* Scape of antennæ shorter, extending only to top of head .... *B. jerdoni*, p. 102.

b. Joints of flagellum of antennæ distinctly longer than broad. Length over 5 mm............. *B. nigrita*, p. 102.

122. **Brachyponera luteipes**, *Mayr* (Ponera), *Verh. zool.-bot. Ges. Wien*, xii (1862), p. 722, ☿ ♀; *Forel* (Ponera), *Jour. Bomb. N. H. Soc.* xiii (1900), pp. 324 & 326, ☿ ♂.

☿. Jet-black, shining; mandibles, flagellum of the antennæ, the legs and apex of the abdomen testaceous brown. Pilosity very sparse, confined to a few erect pale hairs on the clypeus and mandibles and on the apex of and beneath the abdomen. Head, thorax and abdomen covered with a fine delicate silky whitish very short pubescence, and very finely reticulate-punctate, but not opaque. Head posteriorly slightly emarginate, the sides viewed from the front arched outwards; mandibles finely punctured; clypeus anteriorly with a broad medial lobe, the anterior margin of which is arched; antennæ densely pubescent. Thorax rather massive, the metanotum markedly below the level of the pro- and

mesonotum, its basal and apical truncate portions about equal. Node of the pedicel flat in front and posteriorly, rounded above; abdomen rather massive.

♀. Similar to the ☿ but larger; antennæ thicker, the scape proportionately shorter; eyes much larger, ocelli present. Thorax and abdomen more massive.

Fig. 53.—*Brachyponera luteipes*, ☿.

"♂. Of a dusky testaceous yellow. Wings long, lightly yellow, nervures and stigma of a brownish yellow. Rather smooth, subopaque, feebly pubescent; flagellum of the antennæ brown." (*Forel.*)

Length, ☿ 3·5–4; ♀ 4·5; ♂ 4 mm.

Hab. Throughout India, Burma, and Ceylon, extending to the Malay peninsula.

123. **Brachyponera jerdoni**, *Forel* (Ponera), *Jour. Bomb. N. H. Soc.* xiii (1900), pp. 324 & 327, ☿.

☿. Closely resembling *B. luteipes*, Mayr, but distinctly smaller and slighter, with the mandibles, antennæ and legs of a lighter colour than in that species. Thorax with the pronotum more rounded (in *B. luteipes* the anterior lateral angles of the pronotum are very distinct), and the head shorter, more square, the eyes very much smaller, and the whole insect more smooth and shining.

Length, ☿ 3–3·5 mm.

Hab. Recorded from Bengal (*Rothney*), Western (*Wroughton*) and Southern India (*Rothney*), and Assam (*Smythies*).

124. **Brachyponera nigrita**, *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 459, ☿; *Forel* (Ponera), *Jour. Bomb. N. H. Soc.* xiii (1900), pp. 324 & 326, ☿.

☿. Resembles *B. luteipes*, Mayr, but is larger and more slenderly made. Black and shining, the mandibles, flagellum of the antennæ and legs reddish brown. Head without the mandibles nearly square, as broad posteriorly as in front, the cheeks viewed from the front not much arched, nearly straight; mandibles slightly broader than in *B. luteipes*, finely punctured; antennæ longer, more massive; eyes very much larger, placed higher up on the sides of the head. Thorax anteriorly broad, the pronotum strongly convex, the mesonotum raised and very gibbous, the basal portion of the metanotum depressed, longer than the obliquely truncate apical portion. Node of the pedicel as high as the base

of the abdomen and higher than the metanotum; abdomen more massive than in *B. luteipes*.

Length, ☿ 5·5–6 mm.

Hab. Sikhim (*Wroughton & Möller*); Burma (*Bingham*); Tenasserim (*Fea*).

Genus MYOPIAS.

Myopias, *Roger*, *Berl. ent. Zeit.* v (1861), p. 39, ☿ ♀.

Type, *M. amblyops*, Roger, from Ceylon.

Range. Recorded so far only from Ceylon.

"☿. Head quadrate, rounded posteriorly. Eyes very small, lateral, and placed close to the anterior margin of the head. Antennæ 12-jointed, originating near the mouth; scape shorter than the head; the 1st joint of the flagellum is as long as the three succeeding united, the pre-apical three are broader than long, and, together with the long oval apical joint, rather shorter than the three preceding, form a long slender club (*i. e.* the club is 4-jointed). The mandibles are porrect and narrow with a tooth in the middle, and a second tooth before the curved and acute apex. Palpi 3-jointed. The thorax is flat above, compressed on the sides with nearly parallel lateral margins, the prothorax is anteriorly rounded; the mesothorax is short and separated from the pro- as well as the metathorax by a transverse suture. The basal portion of the metanotum is longer than the apical portion.

"The node is thick, roundly cubical, not attached to the abdomen by the whole of its posterior margin, furnished with a small tooth anteriorly on the inner side. The abdomen is nearly cylindrical, armed with a sting; the basal segment anteriorly abruptly truncate, posteriorly constricted, the pedicel is attached to its lower third.

"The front and posterior tibiæ with a large, the intermediate tibiæ with a pectinate spine. Claws simple.

"♀. Closely resembles the ☿, but has larger eyes, three distinct ocelli, and the thorax convex above; the mesothorax is longer and broader than the prothorax; the metathorax is very short and truncate. (The wings wanting.)" (*Roger*.)

125. **Myopias amblyops**, *Roger*, *Berl. ent. Zeit.* v (1861), p. 39, ☿ ♀.

"☿. Reddish or dark brownish red, scape of antennæ and legs brighter, shining; pilosity abundant. Head broader than thorax, with parallel sides, posteriorly lightly rounded and anteriorly lightly convex. The frontal carinæ are arched, rather small, but thick, springing from the vaulted bend of the clypeus near each other, and only separated by a somewhat broad middle line which terminates at the ocellar area (ocelli themselves wanting). The scape does not reach the hinder margin of the head; it is slender at base, broader towards the apex, and like the flagellum is sparsely pilose. The mandibles are smooth, shining, pilose, the dentate

margin darker. The whole head is sparsely coarsely punctured, with smooth shining interspaces; in the antennal hollows and the bases of the antennæ, the punctures are finer and more dense.

"The thorax is in the same way coarsely punctured with smooth interspaces; the apical face of the metathorax is altogether smooth and shining.

"The node is thick, nearly cubical, about as long as it is high, anteriorly and posteriorly abruptly truncate, rounded above, seen from above somewhat broader posteriorly with an upward directed acute hind margin. The coarse puncturing is a little coarser than on the thorax.

"The abdomen is nearly cylindrical, the basal two segments are the largest, and hide the great portion of the other segments. The 1st is anteriorly abruptly truncate, posteriorly rounded and constricted, somewhat coarsely and closely punctured, smooth on the posterior margin. The 2nd segment is more sparsely punctured, and is likewise smooth posteriorly and shining yellow. The sting is somewhat long, bent upwards.

"The legs are bright yellowish red, somewhat slender, pilose. Tibiæ and metatarsi somewhat pilose, on the anterior pair of legs the latter thickly so. The tarsi taken together are almost all longer than the metatarsi. Claws fine, not dentate.

"♀. Closely resembles the ☿; only the head is a little broader than the thorax, the frontal carinæ terminate at the 1st ocellus, broadening somewhat. The thorax as well as the node of pedicel more finely punctured than in the ☿." (*Roger.*)

Length, ☿ 4·4–5; ♀ 4·5 mm.

Hab. Ceylon.

Unknown to me, and apparently very rare. The above, so far as I know, is the only record of the species.

Genus CRYPTOPONE.

Amblyopone, pt., *Motsch. Bull. Soc. Nat. Mosc.* xxxvi (2) (1863), p. 15, ♀.
Cryptopone, *Emery, Ann. Soc. Ent. Fr.* 1893, p. 240.

Type, *C. testacea*, Motsch.

Range. Recorded so far only from Ceylon.

"☿. Clypeus carinate, anterior margin widely arched, acute, not toothed. Mandibles narrow, the masticatory margin very oblique, with 5 teeth. Eyes absent. Frontal carinæ short, close together. Antennæ 12-jointed, club 4-jointed. Thoracic sutures distinct. Pedicel nodiform, inserted at the lower third portion of the anterior face of base of abdomen. Legs thick, short; first joint of tarsus much shorter than the tibiæ; calcaria long, pectinate; claws simple." (*Emery.*)

126. **Cryptopone testacea**, *Motsch.* (Amblypone) *Bull. Soc. Nat. Mosc.* xxxvi (2) (1863) p. 15, ♀; *Emery, Ann. Soc. Ent. Fr.* 1893, p. 240, ☿.

"☿. Testaceous, pubescent, sparsely pilose, subopaque, very

lightly punctured; head opaque, thickly punctured, thorax near the mesonotum narrowly raised, metanotum scarcely depressed but moderately compressed, posteriorly obliquely truncate, the declivous face shining, pedicel rounded above, below furnished with a lamina, the posterior portion of the abdomen shining." (*Emery.*)

"♀. Elongate, opaque, testaceous; eyes large, black, slightly prominent; head subquadrate, posteriorly bilobed, with three distinct ocelli; front raised between the base of the antennæ, carinate on each side, the carinæ posteriorly close together, parallel; clypeus truncate; mandibles porrect, with 5 acute teeth; antennæ clavate, about half the length of the body, 12-jointed; thorax narrower, the head elongate; node thick, subquadrate, with the angles rounded; abdomen about as broad as the thorax, elongate, the first two segments arched, the three following segments shorter, attenuate towards the apex; wings whitish hyaline, nervures testaceous." (*Motsch.*)

Length, ☿ 2·5; ♀ 2 lines. (☿ 6; ♀ 5 mm.)

Hab. Recorded so far only from Ceylon.

Subfamily MYRMECINÆ.

Sufficiently distinguished from the other subfamilies of the *Formicidæ* by the pedicel being distinctly 2-jointed *in all the sexes.* The neuters of the genus *Ænictus* also have the pedicel 2-jointed (♂ one-jointed, ♀ unknown), but they are absolutely without eyes or ocelli, and could only be mistaken for the neuters of *Liomyrmex*. From the latter, however, they can be distinguished at a glance by the long, thick, and massive antennæ planted extremely close to the anterior margin of the head with their bases very close together. In *Liomyrmex*, on the contrary, the antennæ are short and slight, planted proportionately at a distance from the anterior margin of the head and with their bases wide apart. The sting in the *Myrmecinæ* is present but not often exserted, and the pupæ are not enclosed in cocoons.

Key to the Genera *.

A. Antennæ with less than 12 joints.
  a. Antennæ 11-jointed.
    a'. Abdomen viewed in profile flat above, triangular beneath, apex of triangle pointing downwards .... TRIGONOGASTER, p. 285.

* The genus *Trichomyrmex*, Mayr (p. 214), founded on a ♀ and of which the ☿, so far as I know, has not yet been discovered, is not included in this table of genera, which deals only with the characters of the ☿.

b'. Abdomen viewed in profile more or less convex above, not triangular beneath.
a^2. Metanotum unarmed.
a^3. Without eyes or ocelli, blind .. LIOMYRMEX, p. 198.
b^3. Eyes present .... VOLLENHOVIA, p. 213.
b^2. Metanotum armed.
a^3. Lateral margins of head and thorax denticulate and spiny .. CATAULACUS, p. 120.
b^3. Lateral margins of head and thorax not dentate or spiny.
a^4. Pedicel attached to dorsal surface of abdomen .... CREMASTOGASTER, p. 124.
b^4. Pedicel attached to middle of front or to ventral surface of abdomen.
a^5. Pronotum armed with spines or teeth.
a^6. Thorax raised anteriorly, viewed from front with a sharp truncate transverse margin above .... LOPHOMYRMEX, p. 194.
b^6. Thorax not raised, depressed, somewhat flat.. PRISTOMYRMEX, p. 193
b^5. Pronotum not armed.
a^6. Club of antennæ formed of apical 2 joints of flagellum .... PHIDOLOGITON, p. 160.
b^6. Club of antennæ formed of apical 3 joints of flagellum.
b^7. Antennal furrows present .... TETRAMORIUM, pt., [p. 175.
b^7. No antennal furrows.
a^8. Clypeus bicarinate.. MYRMECINA, p. 197.
b^8. Clypeus not carinate. STEREOMYRMEX, p. 218.
b. Antennæ 10-jointed .... SOLENOPSIS, p. 157.
c. Antennæ 9-jointed.
a'. Antennal furrow lateral and deep .. MERANOPLUS, p. 166.
b'. No antennal furrows.
a^2. Clypeus bicarinate.............. OLIGOMYRMEX, p. 152.
b^2. Clypeus not carinate............ CAREBARA, p. 150.
d. Antennæ 7-jointed.................. MYRMICARIA, p. 117.
e. Antennæ 6-jointed .... STRUMIGENYS, p. 147.

B. Antennæ 12-jointed.
a. Posterior margin of clypeus not produced between bases of antennæ .... SIMA, p. 107.
b. Posterior margin of clypeus produced between bases of antennæ.
a'. Pronotum armed with 2 spines .... ACANTHOMYRMEX, [p. 191.
b'. Pronotum not armed.
a^2. Erect hairs on body trifid ...... TRIGLYPHOTHRIX, p. 171.
b^2. Erect hairs on body not trifid; simple.
a^3. First node of pedicel bidentate posteriorly .... ATOPOMYRMEX, p. 189.

b^3. First node of pedicel not dentate posteriorly.
- a^4. Flagellum of antennæ scarcely thickened towards apex, without distinct club.
  - a^5. Calcaria of posterior pair of legs pectinate .... MYRMICA, p. 265.
  - b^5. Calcaria of posterior pair of legs not pectinate, simple.
    - a^6. Clypeus bicarinate and bidentate .... HOLCOMYRMEX, p. 280.
    - b^6. Clypeus not carinate or dentate.
      - a^7. Metanotum unarmed or at most bidentate .... MESSOR, p. 277.
      - b^7. Metanotum armed with 2 short spines .... APHÆNOGASTER, [p. 269.
- b^4. Flagellum of antennæ with distinct club.
  - a^5. Clypeus bicarinate .... MONOMORIUM, p. 199.
  - b^5. Clypeus not bicarinate, occasionally with one carina.
    - a^6. Tibiæ with simple calcaria.
      - a^7. Neuters or workers strongly dimorphous . . PHIDOLE, p. 220.
      - b^7. Neuters or workers monomorphous.
        - a^8. Maxillary palpi 4-jointed; erect hairs on body not clavate; antennal furrow generally present........ TETRAMORIUM, pt., [p. 175.
        - b^8. Maxillary palpi 5-jointed; erect hairs on body clavate; no antennal furrows. . LEPTOTHORAX, p. 214.
    - b^6. Tibiæ without calcaria .... CARDIOCONDYLA, [p. 287.

Genus SIMA.

Eciton, *Jerdon* (*nec Latr.*), *Madr. Jour. L. S.* xvii (1851), p. 111.
Pseudomyrma, *Smith* (*nec Lund*), *Cat.* vi, 1858, p. 159.
Tetraponera, pt., *Smith*, *A. M. N. H.* (2) ix, 1852, p. 44.
Sima, *Roger*, *Berl. ent. Zeit.* vii (1863), p. 178, ♀.

Type, *S. allaborans*, Walker, from Ceylon.

Range. Palæarctic, Ethiopian, and Indo-Malayan regions.

☿. Head more or less rectangular; in profile, truncate anteriorly, the clypeus and mandibles being bent vertically downwards from the line of the front; mandibles linear, very little if at all broader at their apical margins than at their base; clypeus narrow, not produced back between the antennal carinæ, generally with more or less of a posterior median projecting portion; sides above the level of the eyes straight or convex, posterior occipital angles of the head rounded; antennæ 12-jointed, short, somewhat massive, with a distinct thickening towards the apex of the flagellum;

antennal carinæ short, parallel, close together; eyes proportionately large, lateral, situated a little to the front. Thorax elongate, constricted in the middle, the sutures distinct, the metanotum always raised, convex and conspicuous; legs moderately long and stout, the tibial calcaria pectinate, the claws simple. Pedicel remarkably elongate, generally the anterior node and sometimes the posterior node also is elongately petiolate, giving great flexibility to the abdomen; abdomen narrow, more or less cylindrical, attenuate at apex; sting exserted.

♂ & ♀. Very similar to the ☿ and, beyond the sexual differences of the build of the thorax, generally with a longer larger head in the ♀, and a smaller diamond-shaped head in the ♂, with 13-jointed antennæ in the latter; fore wings with a radial, two closed cubitals, and a discoidal cell.

Key to the Species.

A. Ocelli present in ☿ .... *S. rufonigra*, p. 108.
B. Ocelli not present in ☿.
  a. Head narrower posteriorly than in front.
    a'. Clypeus not bidentate .... *S. binghami*, p. 111.
    b'. Clypeus bidentate anteriorly .... *S. birmana*, p. 112.
  b. Head posteriorly as broad as in front, or broader than in front.
    a'. First node of pedicel unarmed beneath.
      a². Petiole anteriorly of 1st node shorter than node itself.
        a³. In profile, metanotum not higher than pro-mesonotum .... *S. allaborans*, p. 113.
        b³. In profile, metanotum distinctly very much higher than pro-mesonotum . *S. aitkeni*, p. 115.
      b². Petiole anteriorly of 1st node as long as, but distinctly not longer than node itself.
        a³. First node as broad as second node .. *S. petiolata*, p. 113.
        b³. First node much narrower than second node .... *S. nigra*, p. 110.
      c². Petiole anteriorly of 1st node distinctly longer than node itself.
        a³. Eyes proportionately rather small, placed closer to anterior than to posterior margin of head .... *S. attenuata*, p. 112.
        b³. Eyes proportionately very large, placed closer to posterior than to anterior margin of head .... *S. fergusoni*, p. 114.
    b'. First node of pedicel armed with a tooth beneath........................... *S. longiceps*, p. 115.

127. **Sima rufonigra**, *Jerdon* (Eciton), *Madr. Jour. L. S.* xvii (1851), p. 111; *id. A. M. N. H.* (2) xiii (1854), p. 53.

☿. Head, the 2nd joint of the pedicel and abdomen black; the mandibles, antennæ, thorax and 1st joint of the pedicel more or less red, varying from light orange-red or orange-yellow to deep

dark brick-red; legs fuscous black, more or less shaded with orange-red; mandibles, clypeus and antennæ yellowish red; pilosity and pubescence sparse, the former consisting of a few scattered pale hairs, the latter very often absent, but when present very thin, short and silky, giving the thorax and abdomen especially a whitish puberulose appearance. Head, legs, 2nd joint of the pedicel and the abdomen shining, very minutely and closely punctured, but not opaque; thorax finely, densely punctured, opaque. Head rectangular, a little longer than broad and only very slightly narrower in front than posteriorly; occiput broadly rounded, almost transverse, the cheeks straight, ending anteriorly in a distinct angle; mandibles coarsely obsoletely striate, more or less broadly linear, the inner and outer margins subparallel, the masticatory margin with 5 or 6 acute teeth; clypeus transverse, narrow, raised in the middle which is slightly produced, giving the anterior margin a bisinuate appearance; antennal carinæ vertical, parallel, with a longitudinal deeply impressed line or groove between them; antennæ short and stout; eyes lateral and somewhat to the front, situated more in the upper than the lower half of the head. Ocelli present. Thorax elongate; the pronotum broad, its anterior lateral angles dentate, a medial small longitudinal tubercle at its posterior margin, pro-mesonotal suture arched to the front; mesonotum small, flat, forming the half of an oval with its posterior margin transverse, a deep and wide emargination at the meso-metanotal suture; metanotum long, longer than the pro- and mesonotum together, oval, convex, its posterior portion oblique to the apex; legs moderately long, stout. Pedicel elongate, the 1st node oval, with a long petiole in front obliquely sloping posteriorly, 2nd node conical, with a short petiole in front, constricted posteriorly; abdomen somewhat small, oval, acute at apex; sting exserted.

♀. Very closely resembles the ☿, but is of course slightly larger and more massive, with a proportionately much shorter metanotum, the mesonotum and scutellum together being much longer than the metanotum; wings hyaline, slightly brownish in tint; 2nd node of the pedicel cup-shaped.

Length, ☿ 10·5–13; ♀ 13–14 mm.

Hab. Throughout our limits.

This species is the most virulent of any ant known to me, its sting being most painful and sometimes causing considerable inflammation. Mr. G. A. James Rothney, in a paper in the Trans. Ent. Soc. London, 1889, p. 353, gives a vivid account of the severe pain caused to him by the sting of one of this species.

S. rufonigra makes its nests in the dead wood of trees, and very often, in Burma at least, in the clefts of the beams and posts of the wooden resthouses scattered over the country. Personally, I opened and examined only one nest, and that was in a hollow in a Pyinkado tree (*Xylia dolabriformis*). The hollow was low down in the tree, and the entrance or entrances, for there were several, were quite at the base of the tree near the ground.

In the paper noted above, Mr. Rothney gives a most interesting account of a fight between a column of *Œcophylla smaragdina*, Fabr. (p. 354), the fierce leaf-building red or yellow ant, and a colony of *S. rufonigra*. The account is too long to quote here, but after several assaults by *Œcophylla smaragdina*, whose mode of attack apparently was to advance in a triangular wedge-shaped formation, the apex towards the enemy, *S. rufonigra* finally triumphed, and was left in peaceable possession of its nest. In the N.W. Provinces I have heard this ant called "lohari," or blacksmith, why I cannot say. So fierce an insect is almost certain to be mimicked, and consequently nearly every nest of *S. rufonigra* has a few mimicking spiders (*Myrmarachne providens*, Peck) about. In these the resemblance to the ant is remarkable; but what is, in my opinion, a far better mimic, at any rate of the ♀ *Sima rufonigra*, is the beautiful wasp *Ampulex constanciæ*, discovered by Mr. Rothney, and named and described by Mr. Cameron (Mem. Manch. L. Ph. Soc. (4) iv, 1891, p. 192, pl. i, fig. 6).

128. **Sima nigra**, *Jerdon* (Eciton), *Madr. Jour. L. S.* xvii (1851), p. 112, ☿; *id. A. M. N. H.* ser. 2, xiii (1854), p. 53, ☿.
Tetraponera atrata, *Smith, A. M. N. H.* ser. 2, ix (1852), p. 44.
Pseudomyrma carbonaria, *Smith, Jour. Linn. Soc.* vii (1863), p. 20, ♀ ☿.

☿. Black; the mandibles, antennæ and legs dark castaneous brown, with scattered erect brownish hairs, and a very sparse and thin pubescence; the thorax and abdomen in certain lights puberulous. Head, thorax and abdomen slightly shining, finely and moderately closely punctured, but not opaque. Head rectangular, a little longer than broad, the posterior margin very broad, as broad as the front of the head, transverse, the lateral angles not prominent, rounded; mandibles broad and linear, the inner and outer margins parallel as in *S. rufonigra*; clypeus narrow, its anterior margin transverse, not medially dentate; front between the comparatively long vertical carinæ raised, tuberculate; antennæ as in *S. rufonigra*; eyes lateral and a little to the front, placed closer to the posterior than to the anterior lateral angles of the head. Thorax as in *S. rufonigra*, but proportionately narrower, more compressed, the emargination at the meso-metanotal suture very much deeper and wider, the metanotum higher, viewed from the side with a regular arch from front to back; legs moderately long, slender. Pedicel much lengthened: the nodes low, petiolate in front, the 1st node from above oval, the petiole long; 2nd node cup-shaped, much broader than the 1st, not constricted posteriorly, and with a shorter petiole, the nodes not dentate beneath; abdomen elongate, narrowly oval.

♀. Very similar to the ☿, somewhat larger, more pilose, the pedicel proportionately slightly shorter, the petiole of the nodes distinctly shorter, the abdomen more massive.

Length, ☿ 7–8; ♀ 11 mm.

Hab. This ant at present is only recorded from Sikhim (*Möller*), Bengal (*Rothney*), Poona (*Wroughton*), the Malabar Coast (*Jerdon*),

Kanara (*Aitken*), Ceylon (*Green & Wickwar*), and throughout Burma and Tenasserim (*Bingham*). It, however, extends into the Malayan subregion.

This, like *S. rufonigra*, is a tree-ant and almost as fierce as that species; its sting, however, is not so severe. Wroughton reports a species of *Salticus* mimicking *S. nigra* as *Myrmarachne providens* mimicks *S. rufonigra*. I have never come across it. Like the species of the allied genus *Pseudomyrma* in America, *S. nigra* sometimes forms its nest in hollow thorns. I have found one such nest in the hollow of a huge thorn on a large creeper growing round a teak-tree in Upper Burma; and Wroughton reports having found the thorns of *Acacia latronum* occupied by colonies of this ant.

129. **Sima binghami**, *Forel, Rev. Suisse, Zool.* x (1902), p. 243, ☿ ♀ ♂.

☿. Black; the mandibles, antennæ, apex of the tibiæ and the tarsi reddish brown; the anterior femora and tibiæ, and the coxæ, femora and tibiæ of the intermediate and posterior legs chestnut-brown, the apical margins of the abdominal segments narrowly yellowish; pilosity fairly abundant, pale; pubescence dense on the thorax and abdomen. Head shining, elongate, rectangular, narrower posteriorly than in front, and about twice as long as broad, the occiput slightly concave, the cheeks straight; eyes placed somewhat to the front and a little nearer the top of the head than to the mandibles; mandibles with the inner and outer margins parallel, the masticatory margin armed with 5 teeth; clypeus narrow, with a medial projecting portion, the anterior margin of which is crenulate and fringed with stiff hairs; antennal carinæ short, vertical, rather close together; antennæ short and stout, the scape barely reaching up to the top of the eyes. Thorax elongate, narrow; the pronotum not so broad as the head, laterally compressed and margined, longer than broad; thorax constricted at the mesonotum, which latter is longitudinally oval, the pro-meso- and meso-metanotal sutures distinct, the thorax in profile broadly emarginate at the latter suture; metanotum elongate, compressed, the basal portion half as long again as the apical portion into which it passes by an abrupt curve; legs slender, comparatively short. Pedicel very long, the nodes more or less petiolate anteriorly; the 1st node narrowly oval, constricted posteriorly; the 2nd conical, broader than the 1st, convex and posteriorly obliquely truncate beneath; abdomen very long, narrow, attenuate and acute at apex.

♀. Closely resembles the ☿, but the head is most remarkably long and narrow, the pronotum is proportionately shorter, and the mesonotum very much longer than in the ☿; wings hyaline with a brownish tint.

♂. Head small from the front, diamond-shaped, strongly constricted anterior and posterior to the eyes, the occiput truncate; antennæ long and filiform, the scape about as long as the 2nd joint of the flagellum. For the rest closely resembling the ♀.

Length, ☿ 7·5–11; ♀ 13–14; ♂ 11 mm.

Hab. North Konkan (*Wroughton*); Assam (*Smythies*); Burma, Pegu Yoma (*Allan*); Ruby Mines (*Bingham*); Shan States (*Thompson*); Tenasserim (*Hodgson*).

130. **Sima birmana,** *Forel, Rev. Suisse, Zool.* x (1902), p. 245, ♀.

☿. Resembles *S. binghami* in sculpture and pubescence, but is entirely black, with the antennæ and tarsi castaneous brown, the apex of the scape and the 1st joint of the flagellum reddish; pilosity and pubescence more sparse than in *S. binghami*. Head rectangular, but very little longer than broad; mandibles as in *S. binghami*, but finely closely striate; clypeus with the anterior margin furnished with two teeth, the medial portion not projecting but subvertical, ciliated. Thorax: the pronotum laterally margined; the metanotum somewhat as in *S. nigra*, but with a very short basal face. Pedicel: the nodes petiolate and longer than in *S. nigra*; abdomen proportionately narrower than in *S. nigra*, but shorter than in *S. binghami*.

♀. Resembles the ☿, but is longer and narrower, with a slightly longer head.

Length, ☿ 7–7·5; ♀ 9 mm.

Hab. Sikhim (*Möller*); Burma, Pegu Yoma (*Allan*).

It is with some hesitation that I identify with this species two specimens of a *Sima* sent me by Mr. F. Möller from Darjiling, and one procured on the Pegu Yoma. The type described by Forel was a ♀ sent by me from Burma.

131. **Sima attenuata,** *Smith* (Tetraponera), *Trans. Ent. Soc. Lond.* 1877, p. 71, ☿.
Sima attenuata, *Smith*, var. thagatensis, *Forel, Rev. Suisse Zool.* x (1902), p. 249, ☿.

☿. Jet-black, smooth and shining; the mandibles, scape and basal three joints of the flagellum of the antennæ reddish brown, the apex of the antennæ fuscous; pilosity and pubescence sparse, whitish in colour; head, thorax and abdomen very minutely, and on the head and thorax closely punctured, but not opaque. Head nearly as broad as long, convex in front and slightly constricted posteriorly, the cheeks convex; mandibles comparatively broad; clypeus vertical, ciliated in front; antennal carinæ highly raised, somewhat long, parallel and close together; antennæ stout, the scape reaching to about two-thirds of the distance to the top of the head; eyes flat, placed somewhat to the front and about the middle of the head. Thorax as in *S. nigra*, but the metanotum not so compressed or raised. Pedicel very much longer than in *S. nigra*, the 1st node narrower, with a petiole in front about one-fifth longer than the node, 2nd node a little broader than the 1st, elongate conical; abdomen as in *S. nigra*.

Length, ☿ 7·5–8 mm.

Hab. Burma, Maymyo, 3000 ft. (*Smythies*), Pegu Yoma (*Allan*); Tenasserim (*Fea*), extending to the Malayan subregion. In Upper

and Lower Burma I only procured typical forms. A specimen from Thagata in Tenasserim, procured by Fea, has been separated by Dr. Forel as var. *thagatensis*. It differs in having the legs as well as the whole of the antennæ brown, and being longer (8·5 mm.) and more robust than the type.

132. **Sima petiolata**, *Smith* (Tetraponera), *Trans. Ent. Soc.* 1877, p. 70.

☿. Jet-black, smooth and shining, with only a few scattered punctures: the anterior pair of legs, and the tibiæ and tarsi of the intermediate and posterior pair very dark brown; mandibles and scape of the antennæ light, somewhat reddish brown, flagellum fuscous; pilosity pale, very sparse except on the scape of the antennæ and tibiæ and tarsi of the legs; pubescence almost entirely wanting (possibly abraded in the type in the British Museum and in the one other specimen I have). Head nearly square, almost as broad as long, the occiput broad, transverse, slightly rounded, the cheeks very convex; the eyes placed to the front and above the middle of the head; mandibles broad from base, as in all the species of the genus, somewhat coarsely longitudinally striate and punctured; clypeus narrow, the basal portion very slightly projecting, subvertical; antennal carinæ short, very close together; antennæ short and stout, the scape barely extending to the top of the eyes; an impressed short longitudinal line on the front below the vertex. Thorax narrower than the head; the pronotum very flat, submargined posteriorly and laterally, arched in front; meso-metanotal suture arched, anteriorly distinct, mesonotum longitudinally oval, raised; the thorax in profile emarginate at the meso-metanotal suture; metanotum shaped as in *S. nigra*, but shorter and not so compressed; legs comparatively long and slender. Pedicel proportionately very long, both nodes with long petioles anteriorly; 1st node large, as broad as the 2nd node and much longer, this latter cup-shaped, not constricted posteriorly; abdomen very narrowly oval.

Length, ☿ 6–6·5 mm.

Hab. Ceylon (*Smith*); Upper Burma, Ruby Mines district (*Bingham*). The specimen from Burma differs a little in being smaller and more slender, and in the pronotum of the thorax being longer, not so flat.

133. **Sima allaborans**, *Walker* (Pseudomyrma), *A. M. N. H.* (3) iv (1859), p. 375, ♂.

Sima compressa, *Roger*, *Berl. ent. Zeit.* vii (1863), p. 179.

Sima subtilis, *Emery*, *Ann. Mus. Civ. Gen.* xxvii (1889), p. 500, ☿, pl. 11, figs. 24 & 25.

☿. Black, highly polished and shining; mandibles and antennæ reddish yellow, legs reddish brown, the femora fuscous; pilosity very sparse, consisting only of a few scattered pale hairs, pubescence entirely wanting, head, thorax and abdomen with only a few

scattered punctures. Head rectangular, longer than broad, the posterior lateral angles not prominent, rounded; mandibles comparatively broad, obscurely longitudinally striate and punctured; clypeus vertical, its posterior portion slightly produced, anteriorly crenulate; antennæ short, comparatively stout; eyes lateral and a little to the front, placed about the middle of the head. Thorax anteriorly flat, compressed; the pronotum nearly square, submargined, contracted anteriorly into a short neck; pro-mesonotal

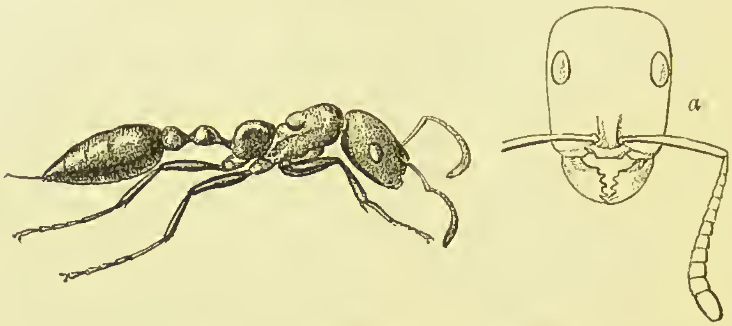

Fig. 54.—*Sima allaborans*, ☿. *a*. Head.

suture distinct but not emarginate; mesonotum longitudinally oval; thorax in profile emarginate at the meso-metanotal suture; metanotum raised, convex, strongly compressed; legs of moderate length, rather stout. Pedicel with the nodes comparatively large, the 1st oval, petiolate anteriorly, the 2nd broader than the 1st, conical; abdomen elongate, narrowly oval.

Length, ☿ 5–6 mm.

Hab. Bengal (*Rothney*); Western India (*Wroughton*); Ceylon (*Rothney & Green*); Burma, Pegu Yoma (*Bingham*), Bhamo (*Fea*).

134. **Sima fergusoni**, *Forel.*

Sima nigra, *Smith, race* fergusoni, *Forel, Rev. Suisse Zool.* x (1902), p. 248.

☿. Resembles *S. nigra*, but is much more slenderly built. Black; mandibles, antennæ and legs obscure castaneous brown, the antennæ with a somewhat reddish tinge; pilosity pale, somewhat abundant, especially on the abdomen. Head as in *S. nigra*, but with the posterior portion of the clypeus not so projecting, shorter. Thorax a little narrower than the head, very deeply emarginate at the meso-metanotal suture, the convexity of the pro- and mesonotum in front of, and the convexity at the metanotum posterior to, the emargination very much more marked than in *S. nigra*. Pedicel remarkably long, the 1st node narrow and with a very long petiole anteriorly; 2nd node also elongate, longer than broad, but conical; abdomen much as in *S. nigra*, but narrower.

Length, ☿ 5 to 5·5 mm.

Hab. Travancore (*Ferguson*); and one specimen which I identify with this species, from the Pegu Yoma in Lower Burma.

135. **Sima longiceps**, *Forel.*

Sima difficilis, *Emery, race* longiceps, *Forel, Rev. Suisse Zool.* x (1902), p. 247, ☿.

"☿. The head with the sides parallel almost up to the anterior margin of the eyes, and above that strongly convex to the occipital lateral angles. Eyes very large, as long as the space which separates them from the anterior margin of the head, posterior margin of the eyes reaching up to the posterior fifth of the head. The scape short and thick, extending up only to the anterior third of the eye. The head is somewhat longer than in *S. allaborans* (less long than in typical *S. difficilis*). Thorax as described * by Emery for *S. difficilis*, but the metanotum is distinctly submargined, nearly margined. The basal face of the metanotum is a little convex, subhorizontal and very distinct from the sloping face, which is subvertical, not forming a single curve with it as in *S. siggi*. First node as in the type of the species, but with a small tooth directed backwards towards the posterior under apex of the node; second node a little less than twice as broad as the 1st, and about as long as broad. Legs and antennæ of a mixed brown and yellow. The abdomen with a somewhat dense pruinose pubescence. For the rest corresponding with Emery's description of *S. difficilis*. The pro-mesonotum is very feebly convex, as in *S. allaborans*. Very distinct from *S. aitkeni* and *S. siggi* † by the form of the thorax and of the pedicel." (*Forel.*)

Length, ☿ 4–5·5 mm.

Hab. Travancore (*Ferguson*).

I have failed to identify this species.

136. **Sima aitkeni**, *Forel, Rev. Suisse Zool.* x (1902) p. 245, ☿.

"☿. Anterior portion of the clypeus subvertical, concave and margined; posterior portion extremely short, reduced nearly to a transverse carina, situated in front of the frontal carinæ and ciliated, without teeth and not crenulate nor projecting in the middle. Mandibles shining, nearly smooth, with only a few feeble striæ. Head rectangular, only a little longer than broad. Eyes very large, their anterior margin reaching to a little below the middle of the sides of the head and posteriorly to between the posterior 5th and 6th of the same (the eye occupies a good third of the length of the head). Frontal carinæ parallel, very close together. Pronotum margined, nearly square. Pro-mesonotum forming a marked convexity, more marked than in *S. nigra*. Emargination

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* "The structure of the thorax is as in that species (i. e. *Sima allaborans*, Walker), but the epinotum (=metanotum) is less compressed, its dorsal face a little depressed."—Emery's description of *S. difficilis* from Sumatra (Ann. Mus. Civ. Gen. xl (1900), p. 677).

† A Siamese species.

at the meso-metanotal suture as in *S. nigra*. Metanotum very short, extremely convex, but a little compressed, forming only a single rounded boss, about twice as long as broad. The 1st node of the pedicel as in *S. allaborans*, with, however, a petiole only half as long as in that species, and about one-third as long as the node itself. Besides, the node is not convex beneath and is petiolate posteriorly as well as in front. Second node about as broad as long, constricted but not petiolate anteriorly. Legs as in *S. allaborans*, less incrassate than in *S. longiceps*. Entirely smooth and shining, very sparsely and finely punctured. Pilosity yellowish, moderately fine on the body, short on the tibiæ and scape and more abundant than in *S. allaborans*. Pubescence very sparse and short. Black; the mandibles, front of the head, antennæ, petiole of the 1st node of the pedicel, circumference of the 2nd node, and margins of the abdominal segments of a reddish yellow, with the club of the antennæ and the middle of the femora and of the tibiæ brown." (*Forel.*)

Length, ☿ 3·7 mm.

Hab. Western India?, Ceylon? (*Green*).

I have given a translation of Dr. Forel's original description of this species, as two specimens of a *Sima* sent to me from Ceylon by Mr. Green, though they answer to the above description fairly well, differ in the points noted below. They are not *S. allaborans* of Walker, and I believe them to be a variety of *S. aitkeni*. They differ from the latter as follows:—Pro-mesonotum rather depressed than forming a marked convexity. First node of the pedicel petiolate in front, with a petiole quite as long as in *S. allaborans*, but with a tooth beneath as in Dr. Forel's description of *S. aitkeni*, and not convex. Dr. Forel has unfortunately omitted to state the habitat of his species.

Two species, presumably belonging to this genus, were described by Dr. Jerdon in the 'Madras Journal of Literature and Science,' vol. xvii (1851) p. 112. These, however, have not, so far as I know, been identified of late years.

Dr. Jerdon's descriptions, which I reproduce below, are of the briefest, and, I fear, preclude the hope of the species being recognized.

"Eciton rufipes, *Jerdon*.

"Worker length $\frac{1}{4}\frac{1}{8}$ths of an inch; head oblong, eyes very large, slightly advanced; thorax considerably grooved; abdominal pedicles long, low; abdomen long, ovate; black, with rufous legs.

"I have only found this species on one occasion under a stone in the Salem district, and know not if it has the dendrophilous habits of the two last."

"Eciton minutum, *Jerdon*.

"Worker about $\frac{1}{6}$th of an inch long, black throughout, very slender; legs rather thick, palpi much exposed. I regret that I have not at present a specimen of this ant to describe more fully."

Genus MYRMICARIA.

Myrmicaria, *Saunders, Trans. Ent. Soc.* iii (1841), p. 57, ♂.
Heptacondylus, *Smith, Cat.* vi (1858), p. 141, ☿.
Physatta, *Smith, Cat.* vi (1858), p. 171, ♀.

Type, *M. brunnea*, Saund.=*M. fodiens*, Jerdon, from India.

Range. Ethiopian and Indo-Malayan regions.

☿. Head short, more or less rounded; mandibles thick, broadening only a little towards the masticatory margin, this latter oblique and armed with 4 acute teeth; clypeus broad, arched in front, the medial portion convex, posteriorly somewhat narrowly rounded between the bases of the antennæ; antennal carinæ parallel, wide apart, front area not clearly defined posteriorly; antennæ 7-jointed, the scape cylindrical, the joints of the flagellum slender, much longer than broad, no distinct club; eyes round, somewhat prominent, placed on the sides of the head a little to the front and closer to the top than to the anterior margin of the head. Thorax: the pronotum more or less globose, convex and rounded above, with the anterior lateral angles above and below marked by distinct tubercles or spines; pro-mesonotal suture obsolete; mesonotum ending posteriorly in a more or less thick, very distinct transverse carina often subdentate at the lateral angles; meso-metanotal suture deep, the thorax incised or narrowly emarginate at the suture; metathorax cubical, compressed, the basal and apical faces subequal, concave from one side to the other, and margined on each side by a carina, the posterior lateral angles of the basal portion armed with an acute oblique spine; legs long and slender. Pedicel: the nodes conical, subequal, slightly compressed, with a distinct but narrow upper surface, the 1st node with a long petiole anteriorly and a very much shorter petiole posteriorly; abdomen broadly oval, subglobose.

♀. Head with the mandibles from the front subtriangular, much broader posteriorly than in front, the cheeks convex, the posterior lateral angles rounded; mandibles, clypeus and antennæ as in the ☿; the eyes larger, placed much higher up just below the upper margin of the posterior lateral angles of the head; ocelli present. Thorax remarkably deep and short, the pronotum vertical, forming no portion of the dorsum; mesonotum very convex and gibbous; scutellum forming a rounded convex boss, overhanging the metanotum, which is entirely vertical and armed laterally with 2 strong spines, thick at base and acute. Pedicel as in the ☿, but the nodes larger, broader; abdomen more massive than in the ☿.

♂. Head very short, with the eyes very much broader than long, transverse; mandibles narrow, rather short, the apex obtusely rounded, not dentate; clypeus broad, convex, rounded anteriorly; antennæ 13-jointed, the scape short, not longer than the apical joint of the flagellum; eyes oval, enormous, occupying about three-fourths of the sides of the head; ocelli moderately prominent. Thorax similar to that in the ♀, but proportionately longer and narrower; the metanotum unarmed, but with a distinct basal

portion strongly curved and passing into the steeply-sloped apical portion. Pedicel elongate, the joints clavate, gradually thickening into a rounded node at apex; abdomen very broad, cordate, convex above.

Myrmicaria brunnea, so far as my experience goes, is a very common ant in Burma and Tenasserim, and also at Kandy in Ceylon. It always nests in the ground, by preference at the foot of a tree, heaping up the excavated earth in grains round the entrance, making a sort of fortification. Messrs. Rothney and Wroughton compare the heaps to volcanic craters. I have never seen *Myrmicaria* attending aphidæ, bugs, or lepidopterous larvæ, nor have I found any ant-cattle or other insects in their nest. The one common species is often found on trees, and abounds on the flowers of mango-trees in Burma. A nest at the foot of a mango-tree in my compound at Maulmain was to my knowledge continuously inhabited by a populous colony of *M. brunnea* for six years; but Mr. Rothney has recorded the existence of a nest in Barrackpore park, which apparently occupied the same site for over twenty years.

Key to the Species.

a. Head more or less striate; mandibles finely striate; pronotum anteriorly convex, not raised .... *M. brunnea*, p. 118.
b. Head and mandibles smooth, not striate; pronotum raised in front, laterally tuberculate above, not convex .... *M. birmana*, p. 119.

137. **Myrmicaria brunnea**, *Saunders, Trans. Ent. Soc.* iii (1841), p. 57, pl. v, fig. 2, ♂.
Myrmica fodiens, *Jerdon, Madr. Jour. L. S.* xvii (1851), p. 115, ♂ ♀; *Emery, Bull. Soc. Ent. Ital.* xxiii (1891), p. 166.

☿. Chestnut-brown, shining; mandibles finely and closely, head and thorax more or less widely, longitudinally striate; the

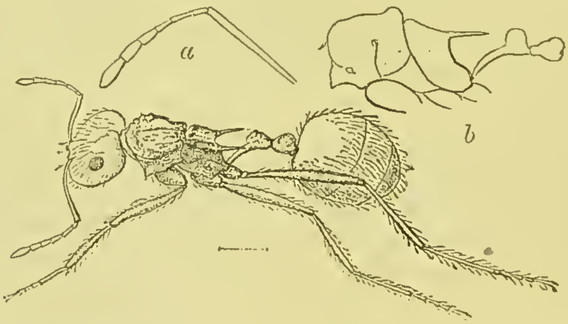

Fig. 55.—*Myrmicaria brunnea*, ☿. *a.* Antenna. *b.* Thorax in profile.

nodes of the pedicel smooth or only slightly rugulose; abdomen polished and smooth; pilosity long, abundant, reddish yellow,

slightly oblique on the antennæ and legs. For the rest the characters of the genus.

♀. Resembles the ☿ in colour; the mandibles are more coarsely striate, the clypeus is smooth, the front between the antennæ and the cheeks longitudinally striate, the head posteriorly on the vertex and lateral angles coarsely reticulate. Thorax: the pronotum somewhat vaguely and transversely and the mesonotum posteriorly longitudinally striate; anteriorly the latter is smooth and polished, the scutellum rugose, the metanotum irregularly striate rugose, including the basal portion of the metanotal spines. Pedicel: the nodes rugulose, opaque; abdomen smooth, polished and shining. Wings hyaline; nervures brownish.

♂. Light chestnut-yellow, the apical margins of the abdominal segments more or less broadly brownish black; head and thorax somewhat densely pubescent, in places rugulose, giving them a dull subopaque look; head on each side of the ocelli longitudinally striate. Some few striæ on the mesonotum posteriorly and on the basal portion of the metanotum, traces of the same on the apical face of the latter. Pedicel obscurely rugulose, subopaque; abdomen smooth, shining, but not highly polished. Wings flavo-hyaline; nervures yellowish.

Length, ☿ 5·5–8; ♀ 12–13; ♂ 10–11 mm.

Hab. Nearly throughout our limits, avoiding the drier and more desert parts of the country.

Var. *subcarinata*, Smith, is slighter, more slender and lighter in colour, often nearly smooth; it occurs in Bengal, Burma, and Tenasserim, and extends down to Borneo. The colour and the rugosity, as well as the pilosity, vary very much; but, so far as a very long series has enabled me to judge, the one species with many slightly differing local races extends through India, Ceylon, and Burma.

138. **Myrmicaria birmana**, *Forel.*

Myrmicaria arachnoides, *Smith, race* birmana, *Forel, Rev. Suisse Zool.* x (1902), p. 243.

☿. Head thorax and pedicel brown; mandibles and abdomen yellow; the antennæ and legs lighter brown than the thorax; entirely smooth, shining and polished, except for a few vague longitudinal striæ on the sides of the metanotum, and numerous small piligerous tubercles scattered on the head and thorax; pilosity yellowish, long, blunt at apex, most plentiful on the antennæ and legs. Head from the front nearly circular, the front convex, the eyes prominent; mandibles not striate, narrow, broadening towards the masticatory margin, which is oblique, armed with 4 acute little teeth; clypeus convex, rounded anteriorly; antennæ very long and slender, much longer and more slender than in *M. brunnea*, the scape extending beyond the top of the head by half its own length. Thorax narrower than in *M. brunnea*; the pronotum higher, not convex, raised in front and formed on each side above into two prominent tubercles, the propleuræ are armed

beneath with a downward pointing tooth; mesonotum from above triangular, concave, the sides and front margined by a sharp carina; meso-metanotal suture deep and well-marked; metanotum compressed; basal portion of metanotum horizontal, laterally bordered by carinæ; metanotal spines long, slightly divergent; apical portion of metanotum vertically truncate; legs enormously long and slender, the posterior legs measuring about 12 mm. Pedicel long; the nodes longer and rounder than in *M. brunnea*, not so conical and high; anterior petiole of 1st node longer than in the above species; abdomen oval.

Length, ☿ 6–6·3 mm.

Hab. I procured this species once only in Burma, in the Pegu Yoma.

Genus CATAULACUS.

Formica, pt., *Latr. Hist. nat. Fourm.* 1802, p. 275, ☿, pl. 12, fig. 75.
Cryptocerus, pt., *Lepel. Hist. Nat. Hym.* i (1836), p. 171.
Cataulacus, *Smith, Trans. Ent. Soc.* ser. 2, ii (1853), p. 225.

Type, *C. taprobanæ*, Smith, from Ceylon.

Range. Palæarctic, Ethiopian, and Indo-Malayan regions.

☿. Head broad, somewhat flat, very slightly convex above, posteriorly transverse or slightly emarginate, with the posterior lateral angles always prominent, dentate or spinous, anteriorly somewhat narrowed, but the sides of the head for their posterior two-thirds are straight, the anterior third being suddenly curved to the base of the mandibles; sides of the head deeply grooved to contain the folded antennæ, the latter when thus folded being invisible from above; mandibles somewhat broad from base and armed with 4 or 5 teeth; the base partially hidden under the lateral laminate angles of the clypeus; the sides of the head above the mandibles are also laminate and slightly curled up; clypeus bent downwards at an angle to the front of the head, triangular, and generally emarginate anteriorly in the middle; frontal area triangular, fairly distinct; antennal groove placed below the eyes; the latter large, lateral and frontal, placed about the middle of the head; antennæ short, stout; scape and flagellum subequal, the latter with 10 joints, the apical three long and incrassate, forming the club. Thorax broad and a little convex above, constricted posteriorly, the basal portion of the metanotum with spines or at least with obtuse teeth at the lateral angles; the sides and apex of the thorax more or less vertical and concave; the margins of the head and thorax denticulate; legs stout, short, the tibiæ flat above and laterally margined; claws dentate at base. Pedicel with the nodes more or less globose, not or very shortly petiolate, in some species dentate beneath; abdomen broadly oval, with the front emarginate at the junction of the pedicel.

♀. Closely resembles the ☿, with the difference in the thorax and abdomen of the sex. The antennæ are 11-jointed as in the ☿, but the metanotal spines are stouter and proportionately shorter.

The two species I know well, *C. taprobanæ*, Smith, and *C. granu-*

latus, Latr., I have always found on the bark or leaves of trees wandering about apparently in an aimless sort of way. The species make their nests in the hollows of branches, and Mr. Wroughton states that they keep ant-cattle in the shape of Lycænid larvæ.

Key to the Species.

a. Basal portion of metanotum with acute spines on the posterior lateral angles.
- *a'*. Reticulate, striate; no raised acute little granular tubercles on abdomen, a few on margins of head and thorax.
  - *a*². Legs with the tibiæ orange-red above . . *C. taprobanæ*, p. 123.
  - *b*². Legs entirely black . . . . *C. latus*, p. 121.
- *b'*. Reticulate, striate, in part punctate; head, thorax and abdomen with more or less irregularly scattered raised acute little granular tubercles above as well as on margins of head and thorax.
  - *a*². First node of pedicel rounded in front . . *C. granulatus*, p. 122.
  - *b*². First node of pedicel obliquely truncate in front . . . . *C. simoni*, p. 123.

b. Basal portion of metanotum without acute spines on the posterior lateral angles, instead these are furnished with obscure blunt projections, not at all conspicuous . . . . *C. muticus*, p. 124.

139. **Cataulacus latus**, *Forel, in Grandidier, Hist. Phys. Nat. Pol. Madag.* xx, pt. 2, p. 144 (1892); *Wroughton, Jour. Bomb. N. H. Soc.* vii (1892) p. 178, pl. c, figs. 8, 9, 10.

☿. Dull dead ink-black, with a mere touch of castaneous brown at the apex of the scape and of the flagellum of the antennæ, and at the joints of the legs; pilosity almost altogether absent, merely a few very short white bristly hairs, chiefly at the apex of and beneath the abdomen; head, thorax and abdomen finely punctured, granulate and opaque, the legs and pedicel coarsely rugose, granulate, the margins, lateral and posterior, of the head and thorax studded irregularly with little blunt points; the

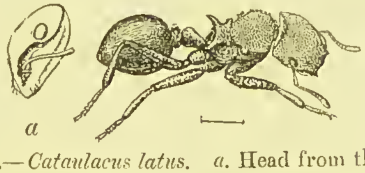

Fig. 56.—*Cataulacus latus*. *a*. Head from the side.

sculpture on the head, thorax and abdomen in certain lights running into striæ. Head much broader than long, lightly convex, the occiput widely emarginate, the posterior lateral angles prominent, slightly dentate; mandibles subtriangular, obscurely striate; clypeus large, widely emarginate anteriorly; antennæ stout, when folded completely hidden from above in the deep fossa beneath the eyes. Thorax: the pronotum broader than long, the anterior margin broad and transverse, the pro-mesonotal suture

distinct and arched to the front; the mesonotum narrower than the pronotum, transversely oval, the meso-metanotal suture visible but not well marked, transverse; metanotum a little depressed, the basal portion about twice as broad as long, the sides denticulate and prolonged posteriorly into long laminate spines pointing backwards and curved a little upwards; legs stout and short, more thickly studded than the body with short stout white bristles. Pedicel short, the nodes not petiolate, thick, nearly subequal in length; the 1st truncate anteriorly, about half as broad again as long; 2nd truncate in front, rounded posteriorly and slightly compressed, broader than long; abdomen cordate, convex above, emarginate anteriorly.

♀. Resembles the ☿, but is of course larger; the head and thorax are coarsely rugose striate, the pedicel irregularly coarsely granulate; abdomen finely longitudinally striate, oval, longer and more massive. Head broader posteriorly than in front, widely but slightly emarginate; mandibles punctured, irregularly striate; clypeus triangular, the suture posteriorly better defined than in the ☿, the frontal area triangular, distinct and smooth; margins of the head and of the thorax as well, with fewer projecting blunt points. Thorax: the pronotum large, forming a part of the dorsum; the anterior angles irregularly rounded; mesonotum triangular, with the angles more or less rounded; scutellum transversely oval; postscutellum transverse; metanotum or median segment large, the basal portion armed with two stout, somewhat flat obtuse spines, the apical portion truncate, concave, irregularly transversely striate. Pedicel with the nodes large, rounded above, a little broader than long; abdomen broadly oval.

Length, ☿ 5–6; ♀ 8 mm.

Hab. Bengal, Orissa (*Taylor*); Burma; Tenasserim (*Bingham*).

140. **Cataulacus granulatus**, *Latr.* (Formica) *Hist. Nat. Fourm.* 1802, p. 275, pl. 12, fig. 75; *Smith, Trans. Ent. Soc.* ser. 2, ii (1854), p. 226, ☿.

☿. Black; the scape and apex of flagellum of the antennæ, and the tibiæ and lower part of the tarsi of the legs reddish brown. Head, thorax and abdomen coarsely rugose, granulate, irregularly longitudinally striate reticulate, the margins of the head and thorax irregularly crenulate or denticulate; the granulate appearance on the upper surface due to small acute tubercles, which, on the margins of the head and thorax and on the abdomen, are studded with very short bristly white hairs; the striæ on the abdomen finer than those on the head and thorax; the abdomen often has a silky, somewhat shining appearance. Head nearly square, as broad posteriorly as long (or a little broader), and narrowing a little towards the front, convex; mandibles stout, striate, with a smooth shining subapical line along the masticatory margin; clypeus triangular, anteriorly depressed, the anterior border medially emarginate, the posterior margins not distinctly

defined; the lateral angles acutely dentate, the posterior lateral angles of the head and the angle in front of the eye also acutely dentate. Thorax: the pro-mesonotal shield broad, convex, the pro-mesonotal suture obsolete; the mesonotum narrowing posteriorly, the meso-metanotal suture visible but not very distinct; the basal portion of the metanotum horizontal, transverse, the lateral metanotal spines not curved upwards; apical portion of metanotum truncate, vertical, transversely coarsely striate; legs stout and short. Pedicel: the nodes more coarsely granulate and rugose than the thorax, both anteriorly truncate, posteriorly rounded, the 1st node somewhat broader than the 2nd; abdomen broadly oval.

♀. Similar to the ☿ in colour, larger and altogether more coarsely sculptured; head and thorax very coarsely cribrate, reticulate, with in certain lights the reticulations running into irregular striæ; abdomen opaque but with a sericeous and, in certain lights, a smooth appearance. Head as in the ☿, but with the ocelli indicated, sometimes nearly obsolete; thorax in shape as in *C. latus* ♀, but the metanotal spines smaller and more slender. Pedicel with the 1st node oval, longer than broad, and distinctly longer than the 2nd node, this latter constricted posteriorly; abdomen somewhat elongate, oval.

Length, ☿ 4; ♀ 7 mm.

Hab. Burma (*Bingham*); Tenasserim (*Hodgson*); extending in the Malayan subregion to Borneo and Sumatra.

141. **Cataulacus simoni**, *Emery, Ann. Soc. Ent. Fr.* lxii (1893), p. 248, ☿.

"☿. Intense black, opaque, densely punctured; the scape of the antennæ and the tibiæ reddish; the head longitudinally rugosely reticulate; the sides of the head in front of the eyes and the posterior angles with an acute tooth; the pronotum in front coarsely reticulate; remainder of the thorax longitudinally rugose, the sides furnished with little spines; metanotum with thick rugose spines; the sloping portion of the metanotum somewhat flat, densely punctured; the pedicel coarsely reticulate; the 1st node obliquely truncate in front; abdomen ovate, finely rugose, for the most part longitudinally reticulate; the back of the femora with obtuse little teeth; the whole insect set with squamiform scattered white hairs.

"*Length*, ☿ 3–3·5: breadth of head 0·9; breadth of pronotum 0·7 mm.

Hab. "Ceylon: Colombo, Kandy." (*Emery.*)

This species is unknown to me, but seems very close to *C. granulatus*, Smith.

142. **Cataulacus taprobanæ**, *Smith, Trans. Ent. Soc.* ser. 2, ii (1853), p. 225.

☿. Intense black; the scape and the basal joint of the flagellum

of the antennæ, and the tibiæ and tarsi of the legs on the outer side yellowish red: head, thorax and abdomen with sparse, very short, white bristly hairs; head and thorax coarsely striate, the striæ running into irregular reticulations in parts; abdomen more finely and regularly striate, the striæ shallow; the margins of the head and thorax studded with minute irregular denticulations. Head, along the occipital margin, as broad as long, the sides of the head on the anterior third rounded, straightening posteriorly; the occiput slightly but widely emarginate, with the lateral angles produced, dentate, a small tooth not very prominent below the eye on each side of the head; mandibles and clypeus as in *C. granulatus*. Thorax: the pro-mesonotal shield very convex, the sides straight, narrowing and rounded abruptly, posteriorly, the anterior lateral angles not prominent; meso-metanotal suture not distinct; the basal portion of the metanotum broader than long; the lateral metanotal spines somewhat short, horizontal, directed backwards and slightly divergent; sides and apical portion of metanotum vertical, the latter slightly concave, obscurely transversely striate. Pedicel short; the nodes subequal, somewhat globose, more coarsely and roughly sculptured than the thorax or abdomen; abdomen short, broadly oval, convex.

Length, ☿ 4–4·5 mm.

Hab. Ceylon (*Smith*); Colombo (*Wickwar*); Kandy (*Green*).

143. **Cataulacus muticus**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 507, pl. x, fig. 17, ☿.

☿. Intense black; the apex of the scape, the tibiæ and tarsi of the legs orange-red; pilosity rather long, whitish in colour; head, thorax and pedicel very coarsely sculptured (more coarsely than in any other species of the genus known to me) and rugose; the head and thorax covered with reticulations, which are raised and tuberculous. Head as in *C. granulatus*, but proportionately larger, with the tooth on the lateral margin of the head below the eye and the spinous process on the posterior lateral margin of the head larger and more produced. Thorax with the sutures obsolete, and the lateral spines on the posterior angles of the basal portion of the metanotum modified into slightly produced rounded projecting laminæ. Pedicel with the nodes remarkably rugose; the 1st node the longer, and longer than broad; the 2nd node oval, truncated in front and posteriorly; abdomen as in *C. granulatus*.

Length, ☿ 5·5 to nearly 6 mm.

Hab. Upper Burma, Ruby Mines district (*Bingham*); Tenasserim (*Fea*).

Genus CREMASTOGASTER.

Formica, pt., *Oliv. Encycl. Méthod., Ins.* vi (1791), p. 497, ☿.
Myrmica, pt., *Latr. Hist. Nat. Fourm.* 1802, p. 261.
Cremastogaster, *Lund, Ann. Sc. Nat.* xxiii (1831), p. 132.

Type, *C. scutellaris*, Oliv., from Europe and North Africa.

Range. Both hemispheres.

☿. Head more or less square from the front, the angles rounded; mandibles strong and thick, but comparatively narrow, the masticatory margin with generally 4 teeth; maxillary palpi 5-, the labial palpi 3-jointed; antennæ (in all Indian species) 11-jointed, the club of the flagellum formed of the 4, 3, or 2 apical joints; eyes lateral, of moderate size; ocelli generally absent. Thorax comparatively narrow, compressed and constricted at the junction of the meso- and metanotum; pro-mesonotal suture not always distinct; meso-metanotal suture deeply marked; metanotum bispinous posteriorly; legs long and slender. Pedicel with the 1st joint more or less broadened, anteriorly concave or flat above; 2nd joint with rounded, slightly raised node, often longitudinally grooved; apex of pedicel attached to the upper basal surface of the 1st abdominal segment; abdomen more or less cordate or subcordate.

♀. Resembles the ☿; in some species ergatoid, wingless, and with the form of the thorax nearly identical with that in the ☿, but the abdomen in these cases serves to distinguish the sex at a glance, being enormously massive and large. Ocelli present, but often distorted and incomplete. Metanotal spines stouter, and thicker at base; in some species absent. Wings: the front wing with only one cubital and one discoidal cell.

♂. Head narrower than the thorax, the occiput broad; eyes large, placed rather high up on the sides of the head; ocelli not prominent; mandibles narrow, with the apex acute; antennæ 12-jointed, the scape short, about equal to the basal three joints of the flagellum, the latter with no distinct club, but the apical joint the longest. Thorax somewhat as in the ♀, but the metathorax unarmed; legs slender; wings more ample, longer and broader proportionately than in the ♀. Pedicel and abdomen as in the ☿; genitalia not prominent.

The ☿ *maj.* and ☿ *min.* in this genus do not differ, except a little in size, in most of the species. *Cremastogaster* is essentially a tree ant, and the majority of the species build brown-papery looking nests of vegetable fibre, more or less, at least in the well-established nests, of a globular shape, and with little projecting eaves covering the numerous entrances into the interior; the interior itself is crowded with a mass of galleries, chambers, &c. with dividing-walls made of the same brittle papery material. A few species construct their nests in the hollows of trees, and still fewer in the ground or under stones. The same species varies in its nesting-habits in different parts of the country. *C. rogenhoferi*, Mayr, for instance, in Burma always builds the ordinary papery nests fixed round the branch of a tree; but in the Eastern Deccan, Wroughton found it building in the hollows of trees.

The Indian species of *Cremastogaster*, when excited or moving quickly, turn their broad, subcordate abdomen over their backs, the feat being more easily performed owing to the fact that in

this genus the apex of the pedicel is fixed to the upper margin of the base of the abdomen, as noted above, and the upper surface of the abdomen itself is more or less flat, the lower surface convex.

Cremastogaster bites virulently, but I do not think uses its sting much. Like very many other ants it tends and keeps "ant-cattle." According to Messrs. Aitken and Taylor, some species build special byres for their "cows." *C. difformis*, *physothorax* and *inflatus* have the metathorax remarkably large and swollen, with a hollow on each side interiorly, communicating exteriorly by a tiny aperture. In live specimens there seems to be a continual flow from this aperture of a sweet fluid, and I have watched the workers of *C. physothorax* licking one another's thoraces vigorously. No species, so far as I know, stores food; but Mr. Wroughton has recorded having witnessed *Cremastogaster perelegans* robbing *Holcomyrmex* of grain, which the latter was harvesting.

Many instances have been noted of woodpeckers, and these, so far as I know, belonging exclusively to the genus *Micropternus*, digging their nest-holes in nests of *Cremastogaster*. Three such nests which I myself found in Burma belonged to *M. phæoceps*, Blyth. Of these, two had been excavated in the nests of *C. ebenina*, Forel, and the third in the nest of *C. artifex*, Mayr. In none of the nests were there any ants left. They had either deserted or been eaten up. That the ants, however, sometimes continue to inhabit their nest after it has been taken possession of by the woodpecker is recorded by Wroughton in a note sent to him by Mr. Aitken.

Key to the Species *.

A. Metathorax not swollen; metanotum bispinous.	
a. Head smooth and shining, at most with a few half-obsolete striæ anteriorly.	
a'. Club of flagellum of antennæ 4-jointed	*C. wroughtoni*, p. 128.
b'. Club of flagellum of antennæ 3-jointed.	
a^2. Pronotum sculptured.	
a^3. Pronotum convex, rounded in front.	
a^4. Lateral angles of pronotum prominent.................	*C. contemta*, p. 130.
b^4. Lateral angles of pronotum not prominent	*C. buddhæ*, p. 132.
b^3. Pronotum flat above, rounded in front.	
a^1. Eyes elongate	*C. hodgsoni*, p. 131.

* *C. ferrarii*, Emery, which is unknown to me, and of which the description is very brief, has been omitted in this key. A translation of the description is, however, given further on (p. 144).

b^4. Eyes round.
a^5. Metanotal spines slender, not thick at base, divergent, straight, not curved...... *C. subnuda*, p. 129.
b^5. Metanotal spines thick at base, less divergent, curved. *C. anthracina*, p. 132.
b^2. Pronotum not sculptured, smooth.
a^3. Basal level portion of metanotum sculptured.
a^4. Pronotum with distinct lateral obtuse tubercles .... *C. sagei*, p. 135.
b^4. Pronotum not tuberculate, convex .... *C. walshi*, p. 136.
b^3. Basal, level portion of metanotum not sculptured, smooth.
a^4. Head, viewed from the front, anteriorly truncate, raised into a high convex cone above.................... *C. aberrans*, p. 136.
b^4. Head, viewed from the front, anteriorly not truncate, not cone-shaped above.
a^5. Pro-mesonotal suture obsolete or very slight.
a^6. Metanotal spines short, much shorter than the length of the basal, level portion of metanotum.. *C. politula*, p. 131.
b^6. Metanotal spines long, longer than basal, level portion of metanotum.
a^7. Cheeks and antennal hollows finely striate. *C. travancorensis*, p. 134.
b^7. Cheeks and antennal hollows not striate .. *C. ransonneti*, p. 137.
b^5. Pro-mesonotal suture well marked, distinct.
a^6. Mesonotum with a distinct transverse impression.............. *C. dalyi*, p. 138.
b^6. Mesonotum without any transverse impression.
a^7. Cheeks finely striate .. *C. soror*, p. 134.
b^7. Cheeks smooth, not striate .... *C. ebenina*, p. 133.
c'. Club of flagellum of antennæ 2-jointed.
a^2. Colour yellowish brown; 2nd joint of pedicel with a broad longitudinal groove above .... *C. millardi*, p. 135.
b^2. Colour paler yellow; 2nd joint of pedicel with no longitudinal groove above .... *C. biroi*, p. 138.
b. Head not smooth, entirely sculptured.
a'. Metanotal spines shorter than metanotum.
a^2. Metanotal spines slender, apex directed backwards and outwards.

a^3. First flattened joint of pedicel with the sides angular in the middle .... *C. dohrni*, p. 139.
b^3. First flattened joint of pedicel with the sides not angular, rounded.................... *C. artifex*, p. 139.
b^2. Metanotal spines very thick at base, apex directed backwards and inwards .... *C. rothneyi*, p. 140.
b'. Metanotal spines distinctly longer than metanotum.
a^2. Pronotum reticulate.
a^3. First flattened joint of pedicel as broad as long, the sides angular in the middle .... *C. rogenhoferi*, p. 141.
b^3. First flattened joint of pedicel distinctly longer than broad; the sides nearly straight, slightly curved outwards .... *C. himalayana*, p. 143.
b^2. Pronotum longitudinally striate.
a^3. Mesonotum with a medial longitudinal carina .... *C. mogdiliani*, p. 144.
b^3. Mesonotum not carinate in the middle.
a^4. First flattened joint of pedicel with the sides strongly arched, nearly semicircular . *C. flava*, p. 142.
b^4. First flattened joint of pedicel with the sides straight, not arched .... *C. perelegans*, p. 142.

B. Metathorax remarkably broad, massive and swollen, no metanotal spines.
a. Metathorax yellow.................. *C. inflata*, p. 145.
b. Metathorax black or dark castaneous brown.
a'. Meso-metanotal suture distinct, but not very deeply marked; base of metanotum above level with mesonotum .... *C. difformis*, p. 145.
b'. Meso-metanotal suture deep and broad; base of metanotum transversely raised and gibbous, higher than mesonotum .... *C. physothorax*, p. 146.

144. **Cremastogaster wroughtoni**, *Forel, Rev. Suisse Zool.* x (1902), p. 206, ☿ ♀.

☿. Brownish or reddish yellow, the posterior three-fourths of the abdomen brown; pilosity yellowish, abundant, fine and long; head, thorax and abdomen smooth and shining in the ☿ *min.*; the cheeks, clypeus, and basal portion of the metanotum longitudinally striate in the ☿ *maj.*; the thorax and pedicel sometimes slightly punctate-reticulate. Head much broader than long, slightly emarginate posteriorly, the occipital broader than the anterior margin; mandibles rugose at base; clypeus broad, convex

in the middle; antennæ rather slender, the scape reaching up to the top of the head; club of flagellum formed of the apical four joints; eyes lateral, a little closer to the top than to the anterior margin of the head. Thorax: the pronotum in the ☿ *maj.* convex, not margined, in the ☿ *min.* depressed and distinctly margined; pro-mesonotal suture distinct but not deep; the meso-

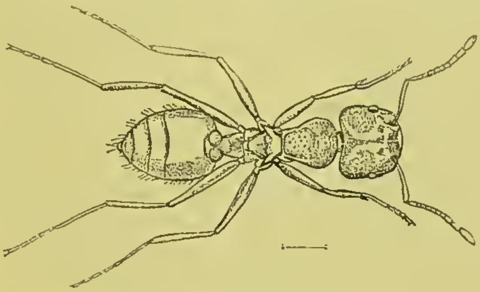

Fig. 57.—*Cremastogaster wroughtoni*, ☿.

notum in the ☿ *min.* subdentate posteriorly, in the ☿ *maj.* the eminences are cariniform; meso-metanotal suture very deep, the sides vertical; basal portion of the metanotum rectangular, twice as broad as long in the ☿ *maj.*, more narrow in the ☿ *min.*; metanotal spines in ☿ *maj.* short and thick, in ☿ *min.* long and slender. Pedicel: the 1st joint broadened, anteriorly concave, as broad as long, the apex posteriorly constricted; 2nd joint with a node anteriorly, longitudinally grooved and forming two rounded eminences; abdomen broadly cordate.

♀. Closely resembles the ☿, but the head is longitudinally striate and the basal margins of the abdominal segments narrowly yellow. Wings hyaline.

Length, ☿ 3·5–5·5; ♀ 8 mm.

Hab. Western India, Poona (*Wroughton*).

145. **Cremastogaster subnuda**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), pp. 680 & 682, ☿.

☿. Dark chestnut-red, the abdomen darkening posteriorly to fuscous black; pilosity almost entirely wanting, represented by a few scattered whitish hairs. Head smooth, with a few very fine indistinct longitudinal striæ on the cheeks, above the antennal hollow, and sometimes on the vertex; seen from the front the occiput is transverse, as broad as the head anteriorly, the cheeks very convex; mandibles punctured, in certain lights finely striate; clypeus anteriorly not quite transverse, slightly rounded, very convex in the middle; antennæ somewhat long and slender, the scape reaching a little beyond the top of the head, the club of the flagellum formed of the last three joints, of which the apical two are abruptly much thickened; eyes lateral, closer to the top of the head than to the anterior margin. Thorax above longitudinally rugulose, the pronotum rather large, rounded in front, subangular at the sides; pro-mesonotal suture tolerably

distinct; the mesonotum small, slightly sloping posteriorly; meso-metanotal suture well marked; the basal portion of the metanotum rectangular, sloping posteriorly, metanotal spines short and acute; apical portion of metanotum more vertical, inclined at an angle to the basal portion, smooth, slightly punctured. Pedicel finely rugulose above, the 1st joint flat above, not very wide, semi-circular in front, with the lateral angles obtuse; 2nd joint above longitudinally grooved, forming two rounded tubercles, with a transverse rounded tubercle at the apex; abdomen broadly cordate.

Length, ☿ 3–3·5 mm.

Hab. Throughout India, except in the hot dry desert parts; Ceylon (*Yerbury*); Assam (*Smythies*); Burma and Tenasserim (*Fea, Bingham, Hodgson*).

Dr. Forel has separated as a race (*C. subnuda* race *rabula*, n. st.) a slightly more robustly built form, which however, so far as I can make out, can barely be distinguished from typical *C. subnuda*, and in my opinion merges into that species through several slightly varying intermediate forms. *C. rabula*, Forel, differs chiefly in the shape of the 1st joint of the pedicel, which is anteriorly straight or slightly laterally angular, but never semi-circular.

146. **Cremastogaster contemta**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), pp. 681 & 685, ☿.

☿. Shining chestnut-red, abdomen darkening posteriorly into dark brown, the base only being chestnut-red. Pilosity almost entirely wanting; pubescence albescent, very fine, thin, short and scattered, the intervals between the hairs somewhat even and regular. Head very highly polished and shining, very globose and strongly convex in front, but broader than long; mandibles very finely longitudinally striate at base; clypeus convex, its anterior margin transverse and somewhat bent inwards; eyes lateral, prominent, rather broadly oval than round. Thorax: the pro-notum convex anteriorly, with the lateral angles very prominent: mesonotum slightly oblique, longer than broad; meso-metanotal suture broad and very well marked, basal portion of metanotum very short, passing by a curve into the long apical portion, which is oblique, steeply sloped; metanotal spines stout, acute, curved a little downwards and inwards, and placed on the sides a little down the oblique sloping portion of the metanotum; the whole thorax and legs shining, the pro- and mesonotum rather closely punctured, the extreme base of the mesonotum longitudinally striate. Pedicel: the 1st joint widened, transversely concave and with a small rounded tubercle at apex above; 2nd joint short, longitudinally furrowed, the furrow widening posteriorly; abdomen smooth, slightly shining.

Length, ♀ 3·1–4·5 mm.

Hab. Bengal (*Rothney*); Western India (*Wroughton*): Ceylon (*Yerbury*).

147. **Cremastogaster politula**, *Forel.*
Cremastogaster subnuda, *Mayr*, *race* politula, *Forel*, *Rev. Suisse Zool.* x (1902), p. 207, ☿.

☿. Light chestnut-red, the flagellum of the antennæ, the thorax, legs and pedicel of a lighter shade, approaching yellowish, the abdomen in some specimens slightly brownish posteriorly; pilosity sparse, consisting of a few scattered pale hairs; head, thorax and abdomen smooth and shining, very minutely but sparsely punctured, nowhere striate or rugulose. Head a very little longer than broad, the cheeks convex; mandibles punctured; clypeus broad and low, the medial portion convex, its anterior margin arched, the sides anteriorly widely emarginate; antennæ long and moderately thick, the scape long, extending beyond the top of the head by about one-fifth of its own length, the club of the flagellum very distinct, formed of the apical three joints; eyes lateral, placed at an equal distance from the top of the head and the base of the mandibles. Thorax: the pronotum broad, flat above, rounded in front, laterally somewhat angular; pro-mesonotal suture obsolete; meso-metanotal suture well marked; narrow basal portion of metanotum passing by a gentle curve into the apical portion; metanotal spines thick at base, very short and acute, pointing obliquely outwards and upwards. Pedicel: the 1st joint flat above, much broadened, subtriangular, with the base rounded, the sides converging to the apex; 2nd joint with a very short, slightly swollen petiole in front, posteriorly longitudinally grooved and formed above into two equal rounded tubercles; abdomen moderately broad and cordate.

Length, ☿ 3–3·3 mm.

Hab. Assam (*Smythies*); Upper Burma, Myitkyina, and Bhamo (*Bingham*).

148. **Cremastogaster hodgsoni**, *Forel*, *Rev. Suisse Zool.* x (1902), p. 204, ☿.

☿. Head, thorax and pedicel dark reddish brown, mandibles, antennæ and legs slightly lighter in colour, abdomen dark brown; pilosity almost entirely wanting, completely absent on the scape of the antennæ and tibiæ of the legs, which, however, have a minute pubescence, visible only in certain lights; head smooth, only slightly shining, rather dull, but not opaque, a few obsolete striæ on the cheeks, the clypeus, and above the antennal hollows. Thorax: the pronotum reticulate, the mesonotum and basal portion of the metanotum longitudinally striate, rugulose; pedicel and abdomen smooth but dull, very minutely reticulate, and in certain lights slightly shining. Head without the mandibles square, in some transverse, in some slightly emarginate posteriorly; eyes slightly elongate; mandibles longitudinally striate and with a few scattered punctures; clypeus convex in the middle, the anterior margin transverse, slightly turned inwards; antennæ comparatively long, the scape reaching a little beyond the top of the head, club

of the flagellum formed of the apical three joints. Thorax somewhat flat above, the pronotum rounded anteriorly and laterally somewhat bituberculate; mesonotum concave, margined; meso-metanotal suture deep, transverse, basal portion of metanotum very short; metanotal spines thick at base, acute at the apices, which are slightly curved inwards. Pedicel: the 1st joint flat above, very broad and rounded anteriorly, constricted posteriorly; 2nd joint with a low rounded node longitudinally grooved; abdomen broad, subcordate.

Length, ☿ 3·5 to nearly 4 mm.

Hab. Upper Burma, Ruby Mines district; Lower Burma, Pegu Yoma (*Bingham*); Tenasserim (*Hodgson*).

149. **Cremastogaster buddhæ**, *Forel, Rev. Suisse Zool.* x (1902), p. 206, ☿.

☿. Dull yellowish brown, the head and abdomen darkening to brown; pilosity very sparse, confined to a few scattered hairs, absent on the scape of the antennæ and tibiæ of the legs; head, thorax and abdomen smooth but only slightly shining, a few fine striæ on the pronotum. Head rectangular, longer than broad; mandibles narrow, punctured and subopaque, not shining; clypeus convex in the middle, anteriorly transverse; antennæ short, the scape not extending to the top of the head; club of the flagellum 3-jointed; eyes round, placed above the middle on the sides of the head. Thorax narrow, the pronotum rounded in front and at the sides; pro-mesonotal suture distinct; mesonotum somewhat long, margined laterally; meso-metanotal suture deeply impressed; basal portion of metanotum broadening posteriorly, obsoletely striate; metanotal spines very short. Pedicel: the 1st joint flat above, rounded in front, the sides forming a conspicuous angle with the anterior margin; 2nd joint with the slightly raised rounded node longitudinally grooved; abdomen rather elongate.

Length, ☿ 2·5 mm.

Hab. N.W. Himalayas, 4000 ft. (*Smythies*); Sikhim (*Möller*); Calcutta (*De Nicéville*).

I am not quite certain whether I am correct in attributing to this species the two specimens I have from Sikhim.

150. **Cremastogaster anthracina**, *Smith, Jour. Linn. Soc.* ii (1857), p. 75, ☿.

☿. Jet-black to reddish brown, smooth, shining and highly polished, the cheeks and antennal hollows slightly longitudinally striate, the thorax and pedicel above finely rugulose; pilosity very sparse, oblique on the scape of the antennæ and on the tibiæ of the legs. Head nearly square, transverse posteriorly; mandibles finely rugulose, opaque, but not striate; clypeus strongly convex in the middle, the whole transverse anterior margin depressed and bent inwards; antennæ short, the scape not extending to the top of the head; the club of the flagellum remarkably thick, formed

of the apical three joints; eyes about midway on the sides of the head. Thorax: the pronotum broad, convex and rounded anteriorly; the pro-mesonotal suture distinct; mesonotum rather flat, rounded anteriorly; meso-metanotal suture deeply impressed; the basal portion of the metanotum horizontal, broadening posteriorly; the metanotal spines divergent, bent a little outwards towards the apex. Pedicel: the 1st joint, with its anterior flat portion, somewhat transversely oval; 2nd joint with a slightly raised rounded node longitudinally sulcate; abdomen broad.

Length, ☿ 3·5–4 mm.

Hab. Ceylon; Burma (*Bingham*); Tenasserim (*Hauxwell*); extending to the Malayan subregion.

The above description is taken from specimens which I have carefully compared with Smith's specimen in the British Museum.

151. **Cremastogaster ebenina**, *Forel, Rev. Suisse Zool.* x (1902), p. 199, ☿ ♀.

☿. Dark shining brown to dark chestnut-red, the abdomen anteriorly above, and in some specimens the mandibles, antennæ, thorax and legs, a lighter shade of chestnut-red; pilosity almost entirely wanting, confined to a few erect pale hairs on the front of the head and on the apex of the abdomen; pubescence pale, exceedingly sparse, and widely but regularly spaced; head, thorax and abdomen smooth, shining, highly polished, with only a few widely scattered minute punctures. Head from the front square; occiput transverse; mandibles obscurely, longitudinally finely striate; clypeus very convex in the middle, its anterior margin transverse; antennæ moderately thick, the scape long, extending beyond the top of the head by about one-fifth of its length; the club of the flagellum not strongly marked, formed of the apical three joints; eyes lateral, a little closer to the top than to the anterior margin of the head. Thorax comparatively narrow, the pronotum deep, rounded in front, the shoulders slightly raised and obtuse, but not tuberculate; pro-mesonotal suture very distinct; the mesonotum slightly raised and laterally compressed; meso-metanotal suture deeply impressed; the metanotum depressed lower than the mesonotum, the basal portion transverse, horizontal, broadening posteriorly; the metanotal spines broad at base, divergent and acute. Pedicel: the 1st joint flat above, as broad as long, the anterior lateral angles prominent, the sides nearly straight; 2nd joint with a broad, rounded, transverse node, not grooved down the middle, but with a slight impression posteriorly; abdomen broadly cordate.

♀. Resembles the ☿, much larger; pilosity more abundant, fairly dense on the metathorax, pedicel and base of the abdomen; mandibles densely finely striate, opaque, covered, as are the antennæ and legs, with an abundant oblique yellowish pubescence. First joint of the pedicel thicker, concave anteriorly above. Wings light flavo-hyaline, nervures darker.

Length, ☿ 3·5–4; ♀ 7·5–8 mm.

Hab. Western India: Thana (*Gleadow*), Poona, Kanara (*Wroughton*); Sikhim (*Möller*): Tenasserim (*Hodgson*).

The specimens from Sikhim and Tenasserim are darker, almost black, the base of the abdomen being always reddish brown. The 1st joint of the pedicel a little longer than broad. This is var. *corax*, Forel.

152. **Cremastogaster soror,** *Forel, Rev. Suisse Zool.* x (1902), p. 200, ☿.

☿. Resembles *C. ebenina*, Forel, but is of an ebon blackness and smaller, the mandibles, the extreme apex of the antennæ and the apical two or three joints of the tarsi brownish; pilosity apparently entirely wanting; head, thorax and abdomen smooth, polished, shining, some vague striæ on the cheeks; the abdomen anteriorly punctured, subopaque. Head somewhat rounded, not square, as broad as long, the occiput rounded, the cheeks strongly convex; mandibles smooth and shining, punctured towards the apex; clypeus convex in the middle, transverse anteriorly; antennæ short, the scape barely extending to the top of the head; the club of the flagellum very distinct, formed of the apical three joints; eyes lateral, placed very nearly in the middle of the sides of the head. Thorax comparatively broader than in *C. ebenina* and not so high, the pronotum shorter, and the mesonotum larger and longer, the rest of the thorax as in *C. ebenina*. Pedicel: the 1st joint very broad, as broad in front as long, constricted a little posteriorly; 2nd joint with a medial longitudinal groove above; abdomen short, broadly cordate.

♀. "Entirely different from *C. ebenina* (♀). Of a dull brownish yellow. Wings hyaline. A strong erect pubescence covers the whole insect. The head is even less truncate in front than it is in *C. aberrans*, to which it bears a resemblance; it is elongate, constricted behind the eyes, longer than broad. Apart from this it is identical with *C. aberrans* and has the metanotum unarmed. But the antennæ and legs are much more slender than in *C. aberrans*; the joints 2–6 of the flagellum of the antennæ twice as long as thick (they are much shorter in *C. aberrans*)." (*Forel.*)

Length, ☿ 3·5 to nearly 4; ♀ 4·3 mm.

Hab. Western India, Poona (*Wroughton*); Bombay (*Rothney*); Upper Burma, Northern Shan States, 2000 ft. (*Bingham*).

153. **Cremastogaster travancorensis,** *Forel, Rev. Suisse Zool.* x (1902), p. 200, ☿.

"☿. Of a uniform black, slightly brownish. Cheeks and antennal hollows striate. Pro-mesonotal suture lightly impressed. Metanotal spines slender, a little longer than the basal face of the metanotum. The body, legs, and scape of the antennæ covered with a fine yellowish pilosity, erect, and somewhat abundant. Pedicel very nearly the same as in *C. ebenina*.

"Length, ☿ 3–3·5 mm." (*Forel.*)

Hab. Travancore (*Ingleby*).

I have a specimen from Tenasserim which I identify somewhat doubtfully as this species. It resembles *C. ebenina*, but is smaller and black: it has the cheeks and antennal hollows finely striate, and the pedicel as in *C. ebenina* var. *corax*, Forel, but differs from Forel's description of *C. travancorensis* by the pilosity being extremely sparse, almost wanting.

154. **Cremastogaster sagei**, *Forel, Rev. Suisse Zool.* x (1902), p. 204, ☿ ♀.

☿. Light chestnut-red all over, smooth, polished and shining, the antennal hollows and the cheeks below the eyes finely striate; pilosity pale, sparse, rather long. Head square, mandibles finely striate at base, clypeus with a small medial impression; antennæ comparatively long, the scape extending slightly beyond the top of the head; club of the flagellum formed of the apical three joints; eyes not prominent, placed rather above the medial line of the head. Thorax: the pronotum slightly convex, rounded anteriorly, somewhat laterally bituberculate; pro-mesonotal suture obsolete; meso-metanotal suture distinct, the thorax constricted and impressed at the suture; metanotum with the basal portion level, widening posteriorly, with very short, acute, divergent spines at the posterior lateral angles, and an obsolete longitudinal stria or two laterally above, apical portion oblique and sloping. Pedicel: the 1st joint flat, circular in front, with a slight wide emargination at apex above; 2nd joint narrower than the 1st, seen from above with three small rounded tubercles; abdomen about as long as the thorax or a little longer.

♀. "Wings hyaline. Metanotum bituberculate." (*Forel.*)

Length, ☿ 3–4; ♀ 8–8·3 mm.

Hab. The Himalayas from Dharmsála (*Sage*) to Sikhim (*Möller*), from 2000 to 7000 ft. elevation.

155. **Cremastogaster millardi**, *Forel, Rev. Suisse Zool.* x (1902), p. 205, ☿.

☿. Head, thorax and pedicel shining yellowish brown, antennæ and legs a little more yellow, abdomen dark brown; head, thorax and abdomen smooth, polished, shining, the last only appearing in a strong light to be faintly punctured at base; pilosity short, somewhat abundant, oblique on the tibiæ and scape. Head nearly as broad as long, sides convex; antennæ of moderate length, the scape barely reaching the top of the head, club of flagellum of only two joints. Thorax: the pro- and mesonotum convex, the pro-mesonotal suture nearly obsolete, meso-metanotal suture distinct with a transverse feeble carina behind it; basal portion of metanotum a little broader than long; metanotal spines short, acute and suberect. Pedicel short: 1st node flat, broadened and arched anteriorly; 2nd node with a deep medial groove; abdomen short and broad.

Length, ☿ 1·9–2 mm.

Hab. Recorded so far only from Tenasserim, Moulmein (*Hodgson*).

156. **Cremastogaster walshi,** *Forel, Rev. Suisse Zool.* x (1902), p. 205, ☿.

☿. Dark piceous, smooth and shining, the basal portion of the metanotum longitudinally striate; pilosity fairly abundant, fine and pale yellowish in colour. Head rectangular, slightly longer than broad; the occiput transverse; mandibles longitudinally striate; clypeus slightly convex in the middle, the anterior margin transverse; antennæ short and thick, the scape not extending to the posterior margin of the head, the flagellum gradually thickened to the apex, the club formed of the apical three joints, but somewhat indistinct; eyes large and flat, a little closer to the top than to the anterior margin of the head. Thorax raised in front and a little compressed, pro-mesonotal suture obsolete, the pro- and mesonotum in profile forming a single unbroken curve; meso-metanotal suture deep; the basal portion of the metanotum short, a little convex; metanotal spines very short, triangular, not divergent. Pedicel: 1st joint slightly broadened, flat anteriorly and narrowed posteriorly; 2nd joint with a rounded, slightly raised node, divided longitudinally by a broad groove; abdomen short and broad.

Length, ☿ 3–3·5 mm.

Hab. Orissa (*Walsh*); Sikhim (*Möller*).

157. **Cremastogaster aberrans,** *Forel, Ann. Soc. Ent. Belg.* xxxvi (1892), p. 531, ☿.

Myrmica diffusa ?, *Jerdon, Mad. Jour. L. S.* xvii (1851), p. 113.

☿. Honey-yellow or light reddish yellow, the abdomen brownish posteriorly, and in the dried specimens in certain lights iridescent; pilosity and pubescence extremely sparse and scattered, almost wanting; head, thorax and abdomen smooth and shining, with a few extremely minute punctures, chiefly on the abdomen. Head seen from the front circular, very convex; mandibles and cheeks minutely longitudinally striate; clypeus proportionately large and broad; antennæ moderately thick and long; the scape reaching slightly beyond the top of the head, the club of the flagellum of 3 joints not well defined, but the apical joint remarkably thick; eyes lateral, placed closer to the top than to the anterior margin of the head. Thorax somewhat short; the pro- and mesonotum massive, from above seeming to form three rounded slight eminences; pro-mesonotal suture slight; meso-metanotal suture well-marked; basal portion of metanotum very short, transverse; metanotal spines short and acute, thick at base. Pedicel short: the 1st joint thick, flattened above at the base, but not very wide; 2nd joint with a rounded small low tubercle at base and a transverse rounded, little raised and undivided node posterior to it; abdomen broad, subcordate.

♀. Resembles the ☿, but is of a light uniform chestnut all over, very smooth, highly polished and shining. Head: the occiput high, rounded, narrower than the anterior margin which is abruptly

truncate; the mandibles folding close into the head; the clypeus remarkably large and broad, its anterior margin transverse; antennæ somewhat slender; the flagellum gradually thickened to the apex, without any distinct club, the last joint the longest; eyes placed about the middle on the sides of the head. Thorax: the pronotum entirely depressed beneath the large convex mesonotum which overhangs it anteriorly; metanotum oblique, entirely unarmed; the thorax declivous but rounded posteriorly. Pedicel short, the 1st joint thick, a little broadened and concave anteriorly; 2nd joint with a narrow transverse undivided, somewhat squamiform node, very narrow, longitudinally rounded above; abdomen larger than in the ☿, subcordate. Wings hyaline, the usual radial, one cubital and one discoidal cell almost obsolete, merely indicated by transparent nervures.

♂. Similar to the ♀, smaller, the head much smaller, the eyes and ocelli large; mandibles narrow and pointed at apex; antennæ filiform, with the scape very short. Thorax and pedicel smaller, but similar to those of the ♀; abdomen short, broad, cordate; the external genital valves broad and curved.

Length, ☿ 2·5–3; ♀ 4; ♂ 3 mm.

Hab. Western India: Thana (*Gleadow*); Kanara (*Palliser*).

Var. *inglebyi*, Forel, from Travancore, differs in not having the head so truncate anteriorly and the antennæ proportionately longer; the scape extends beyond the top of the head.

158. **Cremastogaster ransonneti**, *Mayr, Verh. zool.-bot. Ges. Wien*, xviii (1868), p. 287, ☿.

☿. Head and abdomen dark chestnut-brown; thorax chestnut-red, inclining to yellowish in some specimens; head, thorax and abdomen very smooth, polished and shining all over; pilosity and pubescence light yellowish, very sparse, almost wanting. Head nearly square, slightly broader than long, the occiput transverse; eyes placed about the middle of the head; mandibles punctured, the masticatory margin oblique; clypeus short and broad; antennæ slender, the scape extending a little beyond the top of the head, the club of the flagellum formed of the apical three joints. Thorax comparatively narrow; the pronotum laterally bituberculate and submargined; pro-mesonotal suture indicated but not distinct; metanotum small, oblique; meso-metanotal suture distinct; metanotum depressed, with a broad, very shallow and slight but distinct transverse groove at base; metanotum cubical, basal portion flat, substriate, with very long, acute, slightly divergent spines at the posterior lateral angles, apical portion flat, vertical. Pedicel: the broadened 1st joint slightly concave above, the sides subangular; 2nd joint with a very short but distinct neck or petiole in front, posteriorly raised and rounded, and longitudinally grooved; abdomen broad and very cordate.

Length, ☿ 4–4·5 mm.

Hab. Sikhim (*Bingham*); Kanara (*Wroughton*); Ceylon (*Yerbury & Green*).

159. **Cremastogaster dalyi**, *Forel, Rev. Suisse Zool.* x (1902), p. 201.

☿. Dark dull chestnut-brown with a reddish tinge, smooth and slightly shining, with some obsolete striæ on the clypeus, cheeks and sides of the head; pilosity very sparse, almost entirely wanting. Head without the mandibles a little broader than long, slightly emarginate posteriorly; mandibles longitudinally striate at base and sparsely punctured; clypeus convex in the middle, its anterior margin transverse; antennal hollows large and conspicuous. Antennæ: the scape long, extending a little beyond the top of the head, the club of the flagellum formed of the apical three joints. Thorax somewhat narrow, the pronotum convex and rounded anteriorly; the pro-mesonotal suture conspicuous; mesonotum longer than broad, with a transverse impression; meso-metanotal suture deeply marked; basal portion of metanotum short, transverse, apical portion strongly concave; metanotal spines short, thick at base, acute at apex. Pedicel: the 1st joint flattened, broad in front, slightly constricted posteriorly; 2nd joint with a low rounded node divided longitudinally by a groove; abdomen remarkably broad and flat above.

Length, ☿ 3·5 mm.

Hab. So far only recorded from the Western Gháts (*Daly*).

160. **Cremastogaster biroi**, *Mayr, Termész. Füzetek*, xx (1897), p. 428, ☿; *Forel, Rev. Suisse Zool.* x (1902), p. 203, ☿.

☿. Pale, rather bright yellow, with the masticatory margin of the mandibles and the 2nd and following segments of the abdomen more or less dark brown; head, thorax and abdomen very minutely and delicately punctured, slightly dull, but not opaque, in certain lights shining a little; pilosity very pale yellow, very sparse. Head rather square, a little longer than broad; the occiput transverse; mandibles smooth, the masticatory margin concave, armed with 4 acute teeth; clypeus comparatively large, slightly convex; antennæ with the scape just extending to the top of the head, the club of the flagellum of two joints, the apical joint about twice the length of the penultimate joint; eyes placed well above the middle line of the head. Thorax proportionately rather short; the pro-mesonotum rectangular, a little longer than broad; the pro-mesonotal suture obsolete; the meso-metanotal suture deeply impressed; the metanotum short, the basal portion extremely short, transverse; the metanotal spines at the posterior lateral angles proportionately rather long, curved inwards and slightly downwards, the apical portion of metanotum concave. Pedicel short and broad, the 1st joint flat above, semicircular anteriorly and arched at the sides; 2nd joint seen from above with a transverse rounded portion in front divided by a groove from a rounded tubercle at apex; abdomen proportionately very massive and large.

♀. Ergatoid, wingless, the formation of the thorax being almost identical with that in the ☿; the mesonotum, however, is large and fairly distinct; the metanotum much depressed, nearly vertical;

the metanotal spines broadly triangular at base, acute at apex; pedicel as in the ☿, but the 2nd joint above has a rounded node not very prominent and not divided either transversely or longitudinally by a groove; abdomen enormous, more than twice as long and more than twice as broad as the thorax, very massive. Head, thorax and abdomen of a deeper reddish yellow than the ☿, and finely granulate, opaque.

Length, ☿ 1·8–2·3; ♀ 5·5 mm. (♀ abdomen 3 mm.).

Hab. Kanara (*Aitken*); Dehra Dun (*Smythies*); Sikhim (*Möller*); Ceylon (*Green*).

The specimens from Kanara separated as var. *aitkeni*, Forel, are more pilose, have the thorax striate-reticulate, subopaque, and the metanotal spines divergent, not curved downwards. Specimens from the Himalayas (var. *symthiesi*, Forel) are entirely yellow with scarcely any brown on the abdomen; the head and 1st joint of the pedicel are square, the metanotal spines very long and divergent, and the pilosity very sparse and short.

This remarkable species of *Cremastogaster* is as aberrant in habits as in the form of the ♀. It makes no nests in trees as most of the other species do, but lives in small communities under stones.

161. **Cremastogaster dohrni**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), pp. 681 & 682, ☿.

☿. Dull brownish red or rusty, the antennæ and tarsi paler, the abdomen darkening to brownish towards the apex; pilosity pale reddish, sparse on the scape of the antennæ and tibiæ, oblique. Head longitudinally finely striate, opaque, the striæ divergent posteriorly; mandibles finely longitudinally striate; clypeus convex, anteriorly tranverse, ciliated; eyes round, lateral, placed about the middle of the head. Thorax opaque, somewhat narrow, depressed; the pronotum arched anteriorly, closely finely rugulose granulate; mesonotum and basal portion of metanotum laterally margined, the former rectangular, longer than broad, slightly transversely concave, rugose-granulate; the latter broader than long, longitudinally rugose, its posterior lateral angles armed with two long backward-pointing spines which have a slight downward curve: apical portion of metanotum nearly vertical, highly polished, smooth and shining; legs rather long, slender, finely punctured, subopaque. Pedicel: the 1st joint broad and flat above, obtusely rounded at the sides, and with a round, rather small tubercle at its posterior apex above; 2nd joint of pedicel very short, longitudinally sulcate, the lateral portions rounded; abdomen shining, very finely punctured.

Length, ☿ 3·5–5 mm.

Hab. Ceylon (*Yerbury*); Burma, Pegu Yoma (*Bingham*).

162. **Cremastogaster artifex**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), pp. 681 & 684, ☿ ♂.

☿. Head, thorax, pedicel and the base of the abdomen dark chestnut-red, or chestnut with a yellowish tinge, at times;

abdomen black or dark brown; mandibles, antennæ and legs a lighter chestnut-red; pilosity whitish, abundant and fairly long, especially on the head and thorax; on the legs it is more sparse and oblique; in the ☿ *min.* it is a little less abundant; head finely longitudinally striate; thorax and pedicel more or less coarsely, sometimes finely rugose-reticulate, the mesonotum finely longitudinally striate; abdomen smooth, but not very shining or polished. Head: ☿ *maj.* broader than long, ☿ *min.* square; occiput transverse; mandibles punctured and finely longitudinally striate; clypeus convex in the middle, the anterior margin transverse. Antennæ: the scape not quite reaching (☿ *maj.*) or just reaching (☿ *min.*) the posterior margin of the head; club of flagellum formed of the apical three joints, more distinct in the ☿ *min.* than in the ☿ *maj.*; eyes placed about the middle of the sides of the head. Thorax convex (☿ *maj.*), slightly depressed (☿ *min.*) in front; the pronotum rounded in front and arched at the sides; mesonotum (☿ *min.*) laterally margined, pro-mesonotal suture fairly distinct; meso-metanotal suture deeply impressed; basal portion of metanotum transverse, broader than long; metanotal spines long, divergent and directed backwards and upwards; apical face of metanotum smooth. Pedicel: the 1st joint flat above, very wide and rounded anteriorly and on the sides, narrowed posteriorly; 2nd joint with a slightly raised rounded node, divided longitudinally by a groove; abdomen broad.

♂. "Testaceous, head fuscous or fuscous black, the clypeus paler, abdomen fusco-testaceous or fuscous; the whole insect covered with erect hairs, smooth, shining; mandibles slightly curved at base, plainly narrowed to the apex which is acute; antennæ 12-jointed, short and thick, filiform, the scape about half as long again as thick; the 1st joint of the flagellum globose, the rest cylindrical, clothed with dense, short erect hairs, the 2nd and 3rd joints coalescing and together twice as long as broad, joints 4 and 5 not or perhaps about as long as broad, the others about twice as long as broad; metanotum unarmed; 1st joint of pedicel seen from above quadrate, the angles rounded, 2nd transversely oval above without any longitudinal groove; wings hyaline, the costa testaceous." (*Mayr.*)

Length, ☿ 3·2–5·5; ♂ 3·5 mm.

Hab. Burma: Tenasserim (*Allan*, *Hodgson*, *Bingham*). Extending to the Malayan subregion.

This species is extremely close to *C. dohrni*, but the small differences noted are constant.

163. **Cremastogaster rothneyi**, *Mayr*, *Verh. zool.-bot. Ges. Wien*, xxviii (1878), pp. 681 & 685, ☿.

☿. Head, thorax and pedicel rufo-ferruginous; abdomen fuscous brown to black; the antennæ and legs pale yellow; the head and thorax above sometimes lightly infuscate; pilosity pale yellow, short and obtuse at apex, but fairly abundant, especially on the abdomen; head, thorax and pedicel opaque; abdomen smooth and slightly shining. Head longitudinally finely striate,

a little broader than long; seen from the front the occiput transverse; the eyes large and prominent, placed above the middle of the head; mandibles finely striate; clypeus short, truncate anteriorly; antennæ rather slender but short, the scape not quite reaching the top of the head, the club of the flagellum formed of the last three joints. Thorax finely and very closely reticulate-punctate, rugulose, submargined along the sides; the pronotum somewhat flat above, rounded anteriorly; pro-mesonotal suture indicated, the mesonotum slightly concave; the meso-metanotal suture very distinct; the basal portion of the metanotum transversely rectangular, longitudinally striate; the metanotal spines long and stout, divergent; apical portion of metanotum finely minutely punctured, shining. Pedicel: the 1st joint broad, flat above, broader in front than posteriorly, the sides rounded; 2nd joint seen from above trituberculate on upper side; the tubercles rounded, the anterior one small, the other two larger, side by side, subequal; the whole pedicel rugulose above; abdomen broadly cordate.

Length, ☿ 3–3·5 mm.

Hab. Sikhim (*Möller*); Calcutta, Bhavnagar and Bombay (*Rothney*); Poona (*Wroughton*).

Var. *civa*, Forel, is a form more strongly sculptured.

164. **Cremastogaster rogenhoferi**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), pp. 681 & 683, ☿.

☿. Reddish brown, darkening to brown on the posterior half of the abdomen; the antennæ, legs and posterior margins of the abdominal segments somewhat narrowly yellow; pilosity pale,

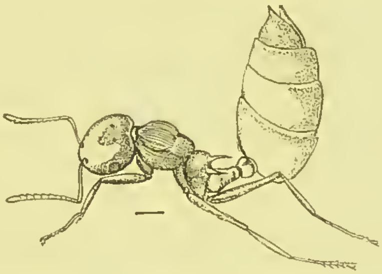

Fig. 58.—*Cremastogaster rogenhoferi*, ☿.

sparse and very short. Head very finely longitudinally rugulose, subopaque, from the front nearly square, the posterior margin transverse; mandibles rugulose; clypeus short, slightly convex, the anterior margin of the medial portion slightly squarely produced; antennæ moderately thick, the scape reaching up to the top of the head, the club of the flagellum formed of the apical three joints; in many specimens the ocelli are fairly distinct; eyes lateral, placed about the middle of the head. Thorax longitudinally rugulose; the pronotum somewhat flat, the sides vertical and narrowing anteriorly; the pro-mesonotal suture distinct; mesonotum curving obliquely back, margined at the sides and

constricted suddenly, narrower than the pronotum; meso-metanotal suture deeply impressed; metanotum depressed, well below the level of the pro- and mesonotum, its basal portion horizontal, broader than long, longitudinally striate, and bearing on each side at the posterior lateral angles a long slender spine, pointing obliquely outwards and curved downwards; apical portion of metanotum slightly concave, smooth and shining. Pedicel thick, the 1st joint flat above, broadening anteriorly, the sides angular in the middle; 2nd joint seen from above with three rounded tubercles, the anterior one small, the posterior two side by side; the whole pedicel above rugulose; abdomen somewhat elongate, the basal segment very minutely reticulate-punctate, opaque, the apical segments shining.

Length, ☿ 3·5–4·5 mm.

Hab. Sikhim (*Möller*); Calcutta (*Rothney*); Western India, from Bombay to Cochin (*Wroughton, Aitken & Rothney*); Ceylon (*Yerbury & Green*); Assam (*Smythies*); Burma (*Fea & Bingham*): Tenasserim (*Hodgson & Bingham*).

165. **Cremastogaster flava**, *Forel, J. A. S. B.* lv (1886), p. 248, ☿.

☿. Pale yellow, the head in front and the apex of the abdomen darkening to brownish; the head, the greater part of the thorax, and the abdomen very finely and delicately granulate, but with a silky shining appearance; pronotum longitudinally striate; pilosity almost entirely wanting, pubescence very sparse, oblique. Head broad, a little broader than long, the occiput transverse, the front with a deep, broadly interrupted, impressed line from the vertex to above the clypeus; mandibles stout, smooth; clypeus very convex, the anterior margin transverse and bent inwards; antennæ rather thick, the scape barely reaching the top of the head; club of the flagellum not remarkably thickened, formed of the apical three joints. Thorax short; the pronotum wide, with an anterior depressed portion and a posterior raised and somewhat gibbous level portion; pro-mesonotal suture indicated, but not distinct; mesonotum with an oblique curved slope to apex: meso-metanotal suture deeply marked; metanotum with the level basal and truncate apical portions subequal, the former longitudinally striate and carrying two long slender spines at the posterior lateral angles, the latter flat, not concave. Pedicel stout, the 1st joint flat above, greatly broadened, the side portions translucent; the 2nd joint seen from above tri-tuberculate, the tubercles rounded above; abdomen very cordate, short and broad.

Length, ☿ 2·5–3 mm.

Hab. Sibságar, Assam; Sikhim (*Möller*); Orissa (*Taylor*); Travancore (*Ferguson*).

166. **Cremastogaster perelegans**, *Forel, Rev. Suisse Zool.* x (1902), p. 202.

☿. Head, thorax and pedicel deep ferruginous red, legs orange-yellow, abdomen black; head, thorax and pedicel finely longitu-

dinally and regularly striate, the striæ more or less obsolete on the apical concave face of the metanotum and on the pedicel ; legs and abdomen smooth and shining ; pilosity almost entirely wanting, pubescence very fine, only visible in certain lights, most abundant on the antennæ and tarsi. Head broader than long, the cheeks remarkably convex ; mandibles longitudinally finely striate ; clypeus convex in the middle, its anterior margin transverse ; eyes broadly oval, placed above the middle line of the head. Thorax : the pronotum rather broad and convex, the pro-mesonotal suture arched ; mesonotum rectangular, sloping, posteriorly convex ; thorax impressed at the meso-metanotal suture ; basal portion of metanotum very short, twice as broad as long ; metanotal spines thick at base, long and acute. Pedicel : the first joint flat, slightly concave, broad anteriorly with the anterior lateral angles prominent, posteriorly narrowed, about as broad at apex as it is broad ; 2nd joint deeply longitudinally grooved above, the portion on each side of the groove rounded ; abdomen long, a little longer than the head and thorax united, posteriorly strongly acuminate.

♀. Resembles the ☿, but is of course larger with a very much more massive abdomen ; the head, thorax and pedicel are darker red ; the head is proportionately much broader, broader than long ; the mesonotum less rugose, more finely punctured, with a few indistinct oblique striæ diverging outwards from a medial line ; the metanotal spines are shorter, more robust ; the basal portion of the metanotum coarsely longitudinally striate, depressed considerably beneath the level of the scutellum, which latter is very gibbous posteriorly ; pedicel broad, the joints slight, convex above ; abdomen smooth, shining, slightly longer than the head and thorax united, and very broad. Wings brownish, hyaline, nervures brown.

♂. Piceous black, with a tinge of red in certain lights. Head much smaller than in the female ; eyes very large and prominent. Antennæ and legs sordid brownish yellow ; wings lacteous with a shade of brown ; pedicel as in the ♀ ; genitalia not exserted. Head, thorax and abdomen finely but very sparsely punctured, pilose.

Length, ☿ 4·3–5·5 : ♀ 11–12 : ♂ 4·5 mm.

Hab. Punjab (*Sage*) ; N.W. Himalayas (*Smythies*) ; Poona (*Wroughton*) ; Tenasserim, Ataran Valley (*Bingham*).

167. **Cremastogaster himalayana**, *Forel, Rev. Suisse Zool.* x (1902), p. 202.

☿. Head, thorax and pedicel bright ferruginous red, the legs slightly paler, abdomen black ; pilosity yellowish, short and oblique ; pubescence pale yellow, dense only on the antennæ and tarsi, on the head and body it can only be seen in certain lights. Head somewhat square, with a distinct broad posterior margin, finely, closely and regularly longitudinally striate ; mandibles longitudinally finely striate, punctured near their apical margins ; clypeus very slightly convex, nearly flat in the middle, its anterior margin

transverse; eyes lateral, placed about the middle of the head and nearly circular. Thorax proportionately rather narrow; pronotum slightly convex, broader than long, rounded at the sides and somewhat coarsely rugose; pro-mesonotal suture visible, arched anteriorly; mesonotum rectangular, longer than broad, oblique, its sloping face with fewer punctures, shining: thorax impressed at the meso-metanotal suture; the basal portion of the metanotum horizontal, longitudinally striate, twice as broad as long; the posterior lateral angles with two long acute spines; apical portion of the metanotum oblique, nearly vertical, slightly concave; legs smooth and shining. Pedicel: the first joint flat above, the sides not much curved nor broadened; 2nd joint viewed from above with a longitudinally impressed line, the portion on each side of the impressed line raised and rounded; abdomen smooth, polished, shining, very minutely and closely punctate.

Length, ☿ 4·3–5·5 mm.

Hab. North-west Himalayas (*Fulton & Smythies*).

168. **Cremastogaster mogdiliani**, *Emery* (Tapinoma), *Ann. Mus. Civ. Gen.* xl (1900), p. 696, ☿.

☿. Dark reddish brown to piceous black, the mandibles, antennæ and legs paler; pubescence long, recumbent, oblique on the scape and tibiæ; head finely and closely striate, thorax more coarsely striate, the pedicel closely punctured, more or less opaque, abdomen smooth. Head somewhat globose, obtusely truncate posteriorly; mandibles finely striate at base, punctured towards the apex; clypeus convex in the middle, in some specimens depressed towards the anterior margin, which is transverse; antennæ comparatively long, the scape extending a little beyond the top of the head; club of the flagellum rather indistinct, formed by the apical 4 joints; eyes placed above the middle on the sides of the head. Thorax: the pro- and mesonotum forming a gentle convexity, the pronotum rounded anteriorly, the pro-mesonotal suture obsolete, the mesonotum laterally margined and with a somewhat conspicuous short medial carina; meso-metanotal suture well-marked; basal portion of the metanotum broader than long; the metanotal spines long, slender, divergent and acute at apex, directed obliquely upwards and backwards. Pedicel: the 1st joint slightly concave above and broadened anteriorly; 2nd joint with a low rounded node not divided by a longitudinal groove, merely with an impression in the middle; abdomen broad and subcordate.

Length, ☿ 2·5–3·5 mm.

Hab. Burma, Tenasserim (*Fea*, *Bingham*). Extending to the Malayan subregion.

169. **Cremastogaster ferrarii**, *Emery*, *Ann. Mus. Civ. Gen.* xxv (1887), p. 533; *id. l. c.* xxvii (1889), p. 506.

"☿. Brown or fuscous, smooth and shining, sparsely pilose, the scape of the antennæ and tibiæ of the legs with erect hairs.

Head in front striate posteriorly, smooth; the club of the antennæ 3-jointed, the basal 9 joints somewhat short. Thorax smooth above, slightly flat; pro-mesonotal suture obsolete, meso-metanotal suture not deeply impressed; metanotal spines obliquely divergent, somewhat close together at their base. Pedicel: the 1st joint sub-trapezoidal, anteriorly rounded, and not much broader than it is posteriorly, the sides nearly straight; the 2nd joint with a medial groove."

"*Length*, ☿ $3\frac{1}{3}$ mm." (*Emery*.)

Hab. Tenasserim (*Fea*), extending to the Malayan subregion.

I have been unable to identify this species.

170. **Cremastogaster inflata**, *Smith, Jour. Linn. Soc.* ii (1857), p. 76, pl. 2, fig. 2.

☿. Head, pro- and mesonotum, coxæ, femora and tibiæ of the legs, and the posterior half of the abdomen chestnut-brown, the antennæ a lighter brown, the metanotum wax-yellow, the tarsi of the legs, the pedicel, and the anterior half of the abdomen above, brownish with a yellow tinge; head, thorax and abdomen smooth and shining, the abdomen minutely and sparsely punctured above; pilosity none; pubescence very sparse, thin and short, whitish in colour. Head without the mandibles square, the occiput broad, a little broader than the head anteriorly, the cheeks slightly convex; mandibles rugulose; clypeus slightly convex in the middle; antennæ moderately thick, the scape just reaching to the top of the head; no distinct club to the flagellum, but the joints increase in length towards the apex, the apical 4 being the longest and somewhat thick; eyes lateral, placed about the middle of the head. Thorax short and broad, the pronotum rounded anteriorly, the pro-mesonotal suture indicated, the mesonotum slightly convex; the meso-metanotal suture distinct; the metathorax enormously swollen and massive, deeply medially emarginate posteriorly, hollow internally, with a septum between the hollow on each side and an orifice at the posterior lateral angle as in *C. difformis*, but higher up. Pedicel and abdomen as in *C. difformis*.

Length, ☿ 4–5 mm.

Hab. Tenasserim, from Mergui southwards, extending to Borneo, Malacca, Java.

171. **Cremastogaster difformis**, *Smith, Jour. Linn. Soc.* ii (1857), p. 76, ☿.

☿. Pitch-black, the thorax and legs sometimes dark chestnut, the whole insect finely and closely punctured, subopaque; pilosity fairly abundant, pale brown, oblique and soft. Head very broad, broader than long, and broader at the transverse occiput than anteriorly; mandibles somewhat coarsely longitudinally striate; clypeus very slightly convex in the middle; antennæ stout, the scape barely reaching up to the top of the head, club of the flagellum formed by the apical 4 joints, not much thickened; eyes lateral, placed

a little above the middle of the head. Thorax widening posteriorly; the pronotum short, rounded in front; pro-mesonotal suture indicated but not distinct; mesonotum slightly convex; thorax slightly constricted at the meso-metanotal suture, which is distinct;

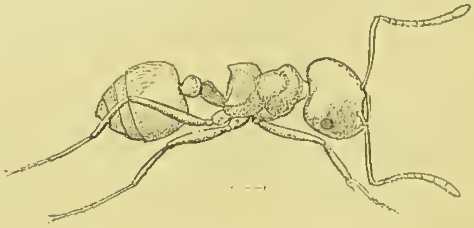

Fig. 59.—*Cremastogaster difformis*, ☿.

metanotum very broad, without spines, but divided into two by a deep, broad, medial sulcation; the posterior lateral angles of the basal portion of the metanotum prominent, beneath them there is an orifice leading to the inside of the lobes of the metathorax, which are hollow and divided by a septum. Pedicel somewhat narrow; the 1st joint flat above, rectangular, longer than broad; 2nd joint with rounded but very slightly raised node above, entire, with no groove or division: abdomen broad and cordate.

Length, ☿ 5–6 mm.

Hab. Southern Tenasserim (*Bingham*), extending to Borneo, Sumatra, and Java.

This species, like *C. inflata*, Smith, carries a store of saccharine matter in the hollows of the metathorax.

172. **Cremastogaster physothorax**, *Emery*.

Cremastogaster difformis, *Smith, race* physothorax, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 506.

☿. Very closely resembles *C. difformis*, Smith, in colour and sculpture, and is in fact the northern form of that species; the head is squarer, as broad in front as it is posteriorly and not longer than broad, the pronotum is proportionately narrower and a little more convex, and the metanotum markedly broader, more swollen, with the medial furrow less deep. For the rest like *C. difformis*.

Length, ☿ 3·5–5·5 mm.

Hab. Tenasserim: Haungdraw Valley (*Fea*), Ataran Valley to Karennee (*Bingham*); Lower Burma, Pegu Yoma (*Allan*).

In addition to the above, the following have been recorded from within our limits, but the descriptions are either inadequate for the determination of the species, or have been taken from ♂ or ♀:—

Myrmica (Cremastogaster) kirbii, *Sykes, Trans. Ent. Soc.* i (1835), p. 99, pl. 1b ♂, 1c ♀.

Myrmica (Cremastogaster) diffusa, *Jerd. Madr. Jour. L. S.* xvii (1851), p. 113.

Myrmica (Cremastogaster) rufa, *Jerd. loc. cit.* p. 114.
Cremastogaster deponens, *Walk. A. M. N. H.* (3) iv (1859), p. 374, ♀.
Cremastogaster pellens, *Walk. loc. cit.* p. 374, ♀.
Cremastogaster forticula, *Walk. loc. cit.* p. 375, ☿.
Cremastogaster brunnescens, *Motsch. Bull. Soc. Nat. Mosc.* xxxvi (1865), p. 20, ☿.
Cremastogaster apicalis, *Motsch. loc. cit.* p. 20, ☿.
Cremastogaster apicalis, *Smith* (*nec Motsch.*), *2nd Yark. Miss.* 1878, p. 12.

Genus STRUMIGENYS.

Strumigenys, *Smith, Jour. Ent.* i (1860), p. 72.
Labidogenys et Pyramica, *Roger, Berl. ent. Zeit.* vi (1862), pp. 249 & 251, pl. 1, figs. 17, 18.

Type, *S. mandibularis*, Smith, from Brazil.

Range. Both hemispheres.

☿. Head more or less cordate, the anterior portion narrowed, snout-like; mandibles very long, the shaft more or less cylindrical, linear, slender and porrect, turned inwards at the apex and tridentate (in Indian species); clypeus with the portion produced back between the base of the antennæ narrow; antennæ 6-jointed, the scape and flagellum folding back into posteriorly divergent grooves, placed above the eyes, these latter situated about the middle of the sides of the head; posterior lateral lobes of the head prominent. Thorax convex anteriorly, not so broad as the posterior portion of the head; seen in profile it is slightly and widely emarginate at the mesonotum; thoracic sutures visible but not deeply impressed, the thorax slightly compressed posteriorly; the basal portion of the metanotum longer than broad, ending (in the Indian species) in two spines or teeth; legs moderately long, rather slender, tibial calcaria absent on the intermediate and posterior legs. Pedicel: the nodes subovate, rounded above, with an elongate petiole to the 1st node in front; 2nd node a little broader than the 1st; abdomen broadly oval, anteriorly slightly truncate.

♀. Similar to the ☿, with the thorax, however, more massive, the vertex of the head bears three ocelli and the eyes are larger; the pronotum is depressed and forms no part of the dorsum; the mesonotum and scutellum are large and somewhat flat, the latter gibbous; the metanotum is depressed, the metanotal spines shorter and the nodes of the pedicel slightly larger than in the ☿. Wings narrow, with a medial and a radial but no cubital or discoidal cell.

Key to the Species.

a. Shafts of mandibles thickened in middle .... *S. lyroessa*, p. 148.
b. Shafts of mandibles not thickened in middle.
  a'. Pronotum punctured, opaque.
    *a*². Shafts of mandibles parallel.
      *a*³. The innermost of the three mandibular teeth the smallest .... *S. feæ*, p. 148.

b^3. The outermost or apical of the three mandibular teeth the smallest ...... *S. godeffroyi*, p. 149.

b^2. Shafts of mandibles not parallel, curved outwards .... *S. lewisi*, p. 149.

b'. Pronotum not punctured, smooth and shining .... *S. smythiesi*, p. 149.

173. **Strumigenys lyroessa**, *Roger* (Labidogenys), *Berl. ent. Zeit.* vi (1862), p. 251, ☿.

"☿. Dark brown, not shining, except the abdomen, the mandibles, the anterior margin of the head, the antennæ, the anterior portion of the pedicel, the apex of the abdomen, the femora and the joints of the tibiæ and tarsi, which are reddish yellow. Head, thorax and nodes, also the scape of the antennæ, granulate; abdomen smooth and shining, with some longitudinal striæ at base. The head with somewhat short, thick, recumbent yellow hairs; pilosity sparse; the hairs on the anterior margin of the scape and on a portion of the sides of the head bent or curved towards their apices. Legs pilose, the pilosity thickened on the tarsi and also on the flagellum of the antennæ, where, however, the hair appears to be more recumbent.

"The mandibles are porrect, about as long as the head, from the point where they are thinnest to the margin of the mouth nearly in the form of a lyre, at the base they are slender, then rounded and broad, and again diminishing; on the outer side thick and convex, on the inner margin concave and sharp; the apex is bent at a right angle inwards, and ends in a sharp upper tooth and a split under one." (*Roger.*)

Length, ☿ 2·5 mm.

Hab. Ceylon. Unknown to me.

174. **Strumigenys feæ.** *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 473.

☿. Resembles *S. godeffroyi*, Mayr, but is slightly larger, with a broader head. Reddish yellow, the mandibles, antennæ and tarsi of the legs slightly paler; head, thorax and anterior node of pedicel finely and very closely punctured, opaque; the legs, disc of the 2nd node of pedicel and abdomen smooth, shining and highly polished, with a few longitudinal striæ at the base of the last. Head slightly broader posteriorly than in *S. godeffroyi*, the mandibles parallel, finely punctured but shining, the carinæ bordering the antennal groove very distinct, rather coarsely rugose between the head and clypeus. Thorax, pedicel and abdomen with the characters of the genus; the metanotal spines very fine, slender, short and acute; the abdomen rather shorter than in *S. godeffroyi*.

♀. Very similar to the ☿, slightly larger, with the sexual differences in the thorax and a slightly larger abdomen; wings hyaline, the nervures pale yellow.

Length, ☿ 2·5; ♀ 2·75 mm.

Hab. Recorded so far only from Lower Burma, Palon (*Fea*).

175. **Strumigenys godeffroyi**, *Mayr, Sitzungsb. Akad. Wiss. Wien*, liii, 1 *Abth.* (1866), p. 516, ☿; *Forel, Rev. Suisse Zool.* x (1902), p. 243, ☿.

☿. Pale reddish, the mandibles, antennæ and legs yellowish; head and thorax somewhat coarsely and very closely punctate-reticulate and opaque, the punctures on the thorax less deep than on the head; abdomen smooth and shining, with the base above covered with short longitudinal striæ; pilosity sparse, white, rather long. Head, thorax and abdomen entirely characteristic of the genus; mandibles very slender, subcylindrical and parallel, bent towards the apex at right angles, and furnished with three teeth, the innermost long and spiniform; clypeus truncate, not produced; antennæ filiform, the scape short, not reaching much beyond the level of the eyes, and with oblique, soft, rather long pilosity. Thorax, pedicel and abdomen with the characters of the genus.

♀. Very similar to the ☿, the thorax and abdomen more massive, the eyes larger, ocelli present; the nodes of the pedicel larger.

Length, ☿ 2·5 to nearly 3; ♀ 3 mm.

Hab. Recorded from Western and Southern India (*Wroughton*). Originally described from Samoa.

The Indian form has been separated as var. *indica*, Forel. It is more pilose, with a slightly longer abdomen, which is also more densely striate at the base.

176. **Strumigenys lewisi**, *Cam. Proc. Manch. L. Phil. Soc.* xxv, 1887, p. 229.

☿. Reddish yellow, the mandibles, antennæ and legs slightly paler; head, thorax and the 1st node of the pedicel closely cribrately punctured, opaque; legs, 2nd node of the pedicel above and abdomen smooth and shining, a few longitudinal striæ at the base of the last; pilosity pale, rather sparse, oblique, nearly recumbent on the tibiæ of the legs. Head slightly convex in front, nearly twice as long as the mandibles; these latter curved outwards, flat above and punctured, the apical tooth the smallest; clypeus truncate anteriorly; eyes small. Thorax, pedicel and abdomen with the characters of the genus. The metanotum and pedicel are encrusted with a spongy substance.

Length, ☿ 2·5–3·5 mm.

Hab. Recorded so far only from Upper Burma, near Bhamo (*Fea*). Described originally from Japan.

177. **Strumigenys smythiesi**, *Forel, Rev. Suisse Zool.* x (1902), p. 242.

☿. Ferruginous yellow, a brighter yellow on the thorax and abdomen, the latter with an ill-defined, transverse, brownish band. Head, antennæ and legs minutely reticulate-punctate, dull and subopaque, the head in certain lights slightly shining, the pedicel covered with a spongy substance; the thorax, nodes of the pedicel and abdomen highly polished, smooth and shining; pilosity sparse,

short and regularly spaced on the head, somewhat long and soft on the abdomen posteriorly. Head more rounded at the sides posteriorly, somewhat narrower than in *S. feæ*, its posterior border semicircularly emarginate; mandibles about half the length of the head, strongly arched outwards; clypeus triangular, with a medial impression; front more convex than in *S. godeffroyi*. Thorax, pedicel and abdomen with the characters of the genus; the metanotum posteriorly without spines, but subdentiform.

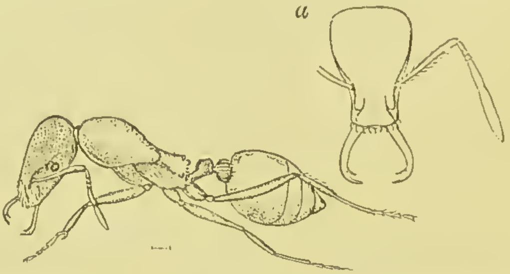

Fig. 60.—*Strumigenys smythiesi*, ☿. *a*. Head from front.

♀. "Pronotum with the anterior lateral angles prominent. Mesonotum smooth, raised. Wings pubescent, subhyaline. For the rest absolutely identical with the ☿ and with the same sparse pilosity. The very long hairs (there are at times some on the legs) are truly plentiful, and have the appearance of clavate threads of a mycelium." (*Forel.*)

Length. ☿ 2·3; ♀ 2·6 mm.

Hab. Recorded so far only from Assam (*Smythies*).

Genus CAREBARA.

Carebara, *Westw. A. M. N. H.* vi, 1841, p. 86, ♀.

Type, *C. lignata*, Westwood.

Range. Ethiopian and Indo-Malayan regions.

☿. Head with the mandibles more or less oval, broader however posteriorly than in front, the occiput rounded; mandibles narrow, subtriangular, the masticatory margin very oblique and strongly dentate; clypeus convex, anteriorly rounded; antennal carinæ very short, clypeal and antennal hollows indistinctly confluent; antennæ 9-jointed, the club of the flagellum formed of the apical two joints, which are compressed and flattened above; eyes and ocelli entirely absent. Thorax broader anteriorly than posteriorly, unarmed; pro-mesonotal suture obsolete, meso-metanotal suture distinct; legs moderately long. Pedicel: the 1st node rounded above, shortly petiolate in front; 2nd node transverse; abdomen oval.

♀. Head without the mandibles inversely trapezoidal, much broader across the occiput, which is transverse, than in front,

nearly one and a half times as broad posteriorly as long; mandibles robust, convex on the outside, the masticatory margin strongly dentate; clypeus remarkably convex in the middle, its anterior margin waved, not quite transverse; antennal and clypeal hollows confluent; antennal carinæ very short; antennæ 10-jointed; no distinct club to the flagellum; frontal area obsolete, but a deep, short, vertical frontal groove; eyes and ocelli large; viewed from the side the head is abruptly truncate posteriorly. Thorax much broader than the head, very massive, the pronotum vertical, not forming part of the dorsum, anteriorly depressed below the mesonotum which is somewhat gibbous in front, strongly convex, and a little longer than broad; scutellum rounded and convex; basal portion of metanotum short and sloping, apical portion vertical, subconcave, the posterior lateral angles a little prominent; legs short and proportionately rather slender. Pedicel somewhat short; the 1st node viewed from the side is triangular, transverse and rounded above the front, subconcave; 2nd node transversely rectangular, the lower anterior lateral angles obtusely tuberculate; abdomen remarkably massive, long, longer than the head and thorax united, somewhat depressed and flat above; wings with one cubital and one discoidal cell, the radial and cubital nervures extend to the margin of the wing.

♂. Head broader than long; eyes and ocelli very large, the former reaching very nearly to the base of the mandibles; mandibles strong, convex above, with a broad masticatory margin armed with 7 teeth; clypeus strongly convex, its anterior margin transverse; antennæ 13-jointed, the scape very short, not quite so long as the 2nd joint of the flagellum. Thorax similar to that of the ♀, but shorter and smaller in every way, the metanotum convex posteriorly. Pedicel similar to that in the ♀, but the nodes not so high, the 2nd node forming a mere ring, and attached to the abdomen by the whole of its posterior face; abdomen long, slightly depressed and curved; wings as in the ♀.

There is only one species of this genus found within our limits, and the descrepancy in size and appearance between the ☿ and the ♀ or ♂ is most striking.

178. **Carebara lignata**, *Westw. A. M. N. H.* vi (1841), p. 86, ♀, pl. 2, fig. 6.

☿. Pale yellow; the masticatory margin of the mandibles brown, a ring of brown at the articulations of the femora and tibiæ of the legs; head finely and closely, sides of the thorax more sparsely punctate; thorax above and abdomen smooth and shining; pilosity pale, oblique, fairly abundant, short on the head, scape of the antennæ and the legs, longer and more sparse on the thorax and abdomen. Head convex, subquadrate, rounded posteriorly and in front; mandibles subtriangular, the masticatory margin oblique, dentate; clypeus convex, produced back posteriorly

between the base of the antennæ; these latter short, the club of the flagellum remarkably thick. Thorax broad, nearly as broad as the head; pronotum rounded anteriorly; basal portion of metanotum short, slightly declivous posteriorly. Pedicel: the nodes rounded above, the 2nd node much broader than the 1st; abdomen broadly oval.

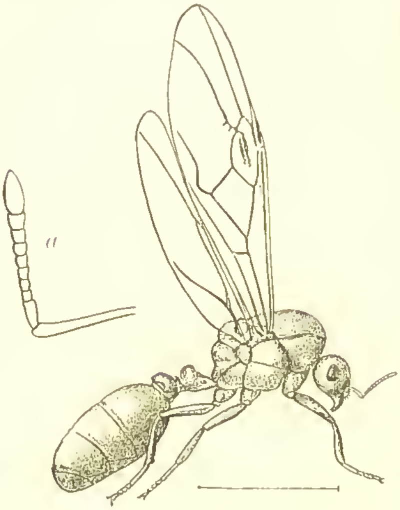

Fig. 61.—*Carebara lignata*, ♀. *a*. Antenna.

♀. Chestnut-brown, shining, the mandibles, antennæ and legs a shade lighter and more reddish, finely punctured all over, the punctures very close on the front of the head, more sparse on the thorax and abdomen, and more minute and dense on the scape of the antennæ and on the legs; pilosity very sparse but long, confined chiefly to the front and underside of the head, and to the abdomen posteriorly, oblique on the tibiæ, the antennæ minutely and densely pubescent. For the rest the characters of the genus.

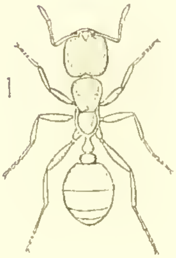

Fig. 62. *Carebara lignata*, ☿.

♂. Uniform yellowish brown, entirely covered by a short dense reddish-yellow pubescence, which is minute and remarkably dense on the antennæ, giving them a velvety appearance; head and thorax very minutely and closely punctured, and finely striate rugulose; abdomen finely but not so closely punctured as the head and thorax; thorax and abdomen slightly shining. For the rest the characters of the genus.

Length, ☿ 2·5; ♀ 16–19; ♂ 13 mm.

Hab. Assam, Burma, Tenasserim (*Bingham*). Extending to China and the Malayan subregion.

Genus OLIGOMYRMEX.

Oligomyrmex, *Mayr*, *Tijds. v. Ent.* x (1867), p. 110, ♀.

Type, *O. concinnus*, Mayr, from Australia.

Range. Palæarctic, Ethiopian, Indo-Malayan, and Australian regions.

♀. Head with the mandibles scutiform or shield-shaped,

posteriorly emarginate, the sides convex, the posterior lateral angles well marked though not prominent; mandibles broad, triangular, the masticatory margin dentate, the apical two teeth long and acute; clypeus not or only feebly bicarinate, its anterior margin more or less emarginate in the middle, truncate or obtusely angular posteriorly; frontal area distinct, triangular; antennæ 9-jointed; club of flagellum formed of the apical two joints, of which the apical joint of all is very long, the club longer than the rest of the flagellum; eyes comparatively large and round, lateral, situated about the middle of the head. Thorax: the pronotum rounded anteriorly, convex, not forming any portion of the dorsum; mesonotum broadening posteriorly, convex, but not gibbous; scutellum convex, slightly prominent; metanotum more or less vertical or steeply declivous, with or without a blunt tooth or tubercle on each side. Pedicel: the 1st node shortly petiolate anteriorly, the petiole gradually thickening up to the node; 2nd node more or less rectangular, often broader than long; abdomen broadly oval, rather massive and bluntly rounded posteriorly. Fore wing with one rhomboidal cubital cell.

☿ *maj.* Resembles the ♀, but with the sexual differences in the shape of the thorax and abdomen; the clypeus (in the one Indian species of which the ☿ is known) is bicarinate, the carinæ convergent posteriorly, anteriorly not emarginate; antennæ 9-jointed as in the ♀; eyes exceedingly small. Thorax: the pro-mesonotal suture obsolete, the pro-mesonotum forming a strong convexity; the thorax constricted and emarginate at the meso-metanotal suture, which is strongly marked; basal portion of metanotum flat, rectangular, laterally submargined, a little longer than the subvertical apical portion. Pedicel short, the 1st node shortly petiolate, transverse, flat anteriorly and posteriorly, with a distinct anterior and posterior margin above; 2nd node rounded, transverse, about as broad as the 1st node and (seen from above) a little longer; abdomen very long and massive.

☿ *min.* Resembles the ☿ *maj.*, but is smaller and entirely without eyes, blind; antennæ similar, but the apical joint in itself as long as the rest of the flagellum. Head rounded posteriorly. Pedicel short, the nodes rounded, the anterior node not petiolate; abdomen small.

♂. Head more or less square; mandibles either dentate or pointed; the antennæ with 13 joints. Thorax shorter and broader than that of the ♀, but similar to it. Pedicel with the nodes low and broad; abdomen smaller and narrower than in the ♀. Wings as in the ♀.

The genus was discriminated by Mayr from the characters as they exist in the ♀. I have therefore in the description of the genus given the characters of the ♀ first. The characters of the ☿ as given above are probably more or less faulty, as the ☿ only of one species is known to me, and that may possibly be an aberrant form.

Key to the Species.

♀ ♀.

a. Length over 5 mm. Colour more or less brown.
  a'. Clypeus not carinate.
    *a*². Anterior border of clypeus emarginate in the middle .... *O. raja*, p. 154.
    *b*². Anterior border of clypeus not emarginate .... *O. leei*, p. 155.
  b'. Clypeus feebly but distinctly bicarinate.. *O. bengalensis*, p. 154.
b. Length under 5 mm. Colour more or less yellow ....
  a'. Second node of pedicel transverse, much broader than long .... *O. asinus*, p. 156.
  b'. Second node of pedicel not broader than long .... *O. rothneyi*, p. 156.

179. **Oligomyrmex raja**, *Forel, Rev. Suisse Zool.* x (1902), p. 216, ♀.

♀. Very dark brown, almost black, the mandibles, antennæ, legs and abdomen chestnut; head, thorax and abdomen shining, the head very finely and superficially longitudinally striate, posteriorly punctured, thorax and abdomen smooth; nodes of the pedicel rugulose, opaque; pilosity sparse and scattered. Head without mandibles nearly rectangular, the sides convex, posteriorly truncate; mandibles somewhat large, finely but rather obscurely longitudinally striate, armed with 6 or 7 teeth; clypeus not carinate, deeply emarginate in the middle anteriorly; antennæ short, the club of the flagellum rather slender, joints 3–5 as broad as long, scape very short; eyes large, placed about the middle of the sides of the head; ocelli not very prominent. Thorax moderately long, the mesonotum broad; metanotum convex, subvertical, without any distinct basal portion. Pedicel: the 1st node petiolate anteriorly, transverse, rounded above, much broader than long; 2nd node a little longer than the 1st and a little broader than long; abdomen massive, rounded at apex. Wings flavo-hyaline.

Length, ♀ 5–5·5 mm.

Hab. Recorded from the North Western Provinces, India (*Smythies*); and from Bhamo, Upper Burma (*Bingham*). Only the ♀ is known.

180. **Oligomyrmex bengalensis**, *Forel, Rev. Suisse Zool.* x (1902), p. 217.

" ♀. Mandibles smooth and shining, a little punctured, armed with 6 teeth. Head shortly rectangular, barely longer than broad, feebly emarginate posteriorly, without a carina behind the ocelli, but feebly subtruncate at the occiput and anteriorly on the clypeus, the posterior portion of the latter with a groove down the middle forms an obtuse angle with the anterior subtruncate portion. This latter is feebly bicarinate, impressed in the middle,

anteriorly feebly emarginate. Frontal area narrowly triangular. Club of antennæ narrower than in *O. rothneyi*, a little shorter than the rest of the flagellum; the scape extends at least up to the posterior ocelli. Thorax much broader than the head; metanotum rounded, with scarcely any appearance of tubercles. First joint of the pedicel as in *O. asinus*, but the petiole is shorter and the node higher, very thick at base. Second node broader than long. Antennæ 9-jointed.

"Front of the head densely striate, the remainder smooth and shining. Back of the head, mesonotum and legs with strong scattered punctures. Abdomen finely punctured. Pilosity short, yellowish, abundant. Tibiæ and scape with close-set hairs. Of a yellowish or reddish brown, or of a brownish yellow. Top of the head and an obscure band on each abdominal segment brownish. Wings subhyaline, nervures a yellow-brown.

♂. "Mandibles armed with 5 teeth. Head square, rather broader than long; antennæ 13-jointed, scape shorter than the 2nd joint of the flagellum. First joint of the pedicel lower, less concave in front and less petiolate than in *O. rothneyi*. Abdomen narrow, a little depressed; genital valves smaller than in *O. rothneyi*. Head striate and rather opaque, the rest shining and punctured. Pilosity as in the ♀. Brown; legs, antennæ and mandibles yellowish." (*Forel.*)

Length, ♀ 5·5; ♂ 4·3 mm.

Hab. Recorded only from Bengal (*Rothney*).

181. **Oligomyrmex leei**, *Forel, Rev. Suisse Zool.* x (1902), p. 216.

"♀. Mandibles shining, punctured, armed with 6 teeth. Head and antennæ identical with those of *O. raja*, but the clypeus is not, or scarcely at all, emarginate anteriorly in the middle, the scape is not subclavate, and joints 2–4 of the antennæ are broader than long. Frontal area elongate. Thorax the width of the head. Metanotum subvertical, with two large obtuse teeth. First node of the pedicel a little more squamiform than in *O. raja*. Second node trapeziform, constricted in front. Front of the head striate save the middle of the clypeus which is smooth. The rest of the head strongly punctured, the punctures deep, coarse, abundant, but regularly spaced; more feeble and scattered on the abdomen, obsolete on the last segment. Between the punctures the chitinous covering is smooth. Pilosity sparse on the body, none on the scape of the antennæ and the tibiæ of the legs. Pubescence sparse but distinct. Wings moderate, nervures dark brown; the radial cell closed. Black; the mandibles, antennæ, legs excepting the coxæ and abdomen of a reddish yellow, nearly orange. Wings brownish." (*Forel.*)

Length, ♀ 7–8 mm.

Hab. Mysore (*Lee*). Unknown to me.

182. **Oligomyrmex asinus**, *Forel, Rev. Suisse Zool.* x (1902), p. 214.

☿ *maj.* Reddish yellow; the legs, pedicel and abdomen of a paler shade; head anteriorly obscurely longitudinally striate, very sparsely punctured, the rest smooth, polished and shining; pilosity pale yellow, fairly plentiful. Head long, about twice as long as broad, not very convex in front, the posterior lateral angles prominent and each furnished with a remarkable spine on the apex; between these spines, viewed from the front, the head appears widely emarginate; mandibles broad, smooth and shining, furnished with 5 teeth; clypeus prominent in the middle, bicarinate,

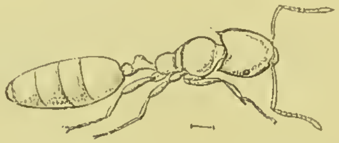

Fig. 63.—*Oligomyrmex asinus*, ☿ maj.

but not dentate; antennæ short, the scape barely reaching halfway up the head; eyes minute, placed very close to the anterior margin of the head. Thorax: the pro-mesonotum remarkably raised, convex, rounded at the sides; the meso-metanotal suture deeply impressed, the thorax constricted and emarginate at the suture; metanotum flat, submargined and subdentiform posteriorly. Pedicel: 1st node broader than long, rounded anteriorly, petiolate; 2nd node rounded, transverse, abdomen long and massive.

☿ *min.* Resembles the ☿ *maj.*, but is paler in colour, entirely devoid of eyes and of the remarkable horns on the posterior lateral angles of the head. The pedicel is proportionately shorter, and the abdomen small, not massive.

♀. Resembles the ☿ *maj.*, but is totally devoid of the horns on the posterior lateral angles of the head. Head short, only a little longer than broad, transverse posteriorly, with a few transverse striæ between the ocelli; a prominent stria or carina connecting the posterior two ocelli. Thorax somewhat long and narrow, narrower than in *O. raja*; the metanotum posteriorly with two long rounded tubercles. Colour as in the ☿ *maj.*

Length, ☿ *maj.* 2·5–4; ☿ *min.* 1; ♀ 4·5 mm.

Hab. Bengal (*Taylor*).

183. **Oligomyrmex rothneyi**, *Forel, Rev. Suisse Zool.* x (1902), p. 218, ♀.

♀. Reddish yellow, the antennæ and legs paler yellow, the abdomen slightly brownish; head, thorax and abdomen shining; the head, between and over the base of the antennæ, finely longitudinally striate, posteriorly together with the thorax and pedicel minutely but very sparsely punctured; abdomen smooth and

polished; pilosity and pubescence pale yellow, fairly abundant, on the tibiæ the hairs are oblique and somewhat dense. Head without the mandibles a little longer than broad, the sides convex, the eyes remarkably prominent, the posterior border not emarginate, transverse, and the carina behind the ocelli obscure; mandibles broad, shining; clypeus as in *O. asinus* ♀; antennæ short, the scape not quite reaching up to the anterior ocellus. Thorax narrow, narrower than in *O. asinus*, the mesonotum strongly convex from side to side, the metanotum bituberculate, the apex seen from above truncate. Pedicel: the 1st node squamiform, somewhat flat above, the 2nd node broader anteriorly than posteriorly, rounded; abdomen elongate, a little depressed.

♂. "Antennæ 13-jointed; scape as long as the 2nd joint of the flagellum. Head subrectangular, longer than broad. The eyes occupying more than half the sides. Mandibles very pointed. Clypeus carinate, biemarginate, produced and subacuminate in the middle anteriorly. Thorax narrow as in the ♀, but the tubercles of the metanotum less produced, more rounded. First node of the pedicel low, as broad as long. Exterior genital valves very large, obtuse, broad and rounded. Abdomen narrow and depressed. Sculpture and pilosity as in the ♀, but the hairs of the tibiæ subadjacent. Brownish. Legs and antennæ of a dingy yellow. Wings a little tinted with brown. Nervures as in *Solenopsis*." (*Forel.*)

Length, ♀ 3–3·5; ♂ 3–3·4 mm.

Hab. Recorded from Barrackpore (*Rothney*).

Genus SOLENOPSIS.

Formica, pt., *Latr. Ess. Hist. Fourm. Fr.* 1798, p. 46.
Myrmica, pt., *Latr. Gen. Crust. & Ins.* iv, 1809, p. 131.
Atta, pt., *Fabr. Syst. Piez.* 1804, p. 423.
Solenopsis, *Westw. A. M. N. H.* vi (1841), p. 86.

Type, *S. mandibularis*, Westw.=*Atta geminata*, Fabr., from America.

Range. Both hemispheres.

♃. Head more or less square, posteriorly slightly emarginate, with a medial distinct groove down the front; mandibles very thick and curved, the masticatory margin blunt, without teeth; maxillary and labial palpi alike two-jointed *; clypeus narrow at the sides, in the middle produced back between the antennal carinæ to above the base of the antennæ, channeled down the middle, the sides of the channel forming a ∩-shaped carina, the apices of which on each side project as small acute teeth beyond the anterior margin of the clypeus; antennal carinæ short, wide apart and parallel; antennæ 10-jointed, club of the flagellum formed of the apical two joints, very thick and massive; eyes

* In *S. wroughtoni* from Bengal the maxillary palpi are only one-jointed.

small, round, rather flat. Thorax narrow; pronotum rounded anteriorly, pro-mesonotal suture tolerably distinct, mesonotum very convex; meso-metanotal suture deeply impressed; the basal portion of the metanotum passing into the apical portion by a regular curve, and longitudinally channeled down the middle, with the sides projecting posteriorly and triangularly at the posterior lateral angles; legs somewhat slender and long. Pedicel: the 1st node squamiform, transverse, shortly petiolate anteriorly, the petiole and front of node viewed in profile forming a regular curve; 2nd node from above transversely oval, broader than long; abdomen oval anteriorly, slightly truncate.

☿. Resembles the ♃, but is, of course, much smaller, the mandibles are 4-dentate; the apical tooth long and acute, the pro-mesonotal suture obsolete, thorax seen in profile emarginate at the meso-metanotal suture.

♀. Head as in the ♃, but the eyes larger and ocelli present, the medial groove more feebly impressed, the antennæ 11-jointed. Thorax a little broader than the head, the mesonotum long, gibbous in front, convex; metanotum short, unarmed, the basal portion oblique, the apical portion vertical. Pedicel as in the ♃, but shorter and more stoutly built, the 2nd node not so thick above as in the ♃, with the short petiole connecting it posteriorly with the abdomen thicker; abdomen more massive, an elongate oval. Fore wing with one cubital and one discoidal cell.

♂. Resembles the ♀, but the head is smaller, the thorax proportionately very much more massive and deeper. Head short, very much broader in front than posteriorly; mandibles narrow, with three acute teeth, clypeus arched; eyes and ocelli large and very prominent; antennæ 12-jointed, the scape short, about as long as the 2nd joint of the flagellum. Thorax: the mesonotum extraordinarily convex and gibbous in front, entirely suppressing the pronotum, which is greatly narrowed in front; scutellum very convex and raised higher than the mesonotum; metanotum unarmed, roundly sloped posteriorly. Pedicel much as in the ♀; abdomen shorter, broadly oval. Wings as in the ♀, but the cubital cell in the fore wing broader and shorter.

Key to the Species.

☿ ☿.

a. Length over 3 mm. .... *S. geminata*, p. 158.
b. Length under 2 mm.
  a'. Reddish yellow; head and thorax opaque, sculptured .... *S. wroughtoni*, p. 159.
  b'. Dark reddish brown; head and thorax smooth, highly polished, shining ...... *S. nitens*, p. 160.

184. **Solenopsis geminata**, *Fabr.* (Atta), *Syst. Piez.* 1804, p. 423.

♃. Reddish yellow; the mandibles dark reddish brown, the

abdomen with some transverse brown markings; head, thorax, pedicel and base of abdomen more or less shining, with scattered

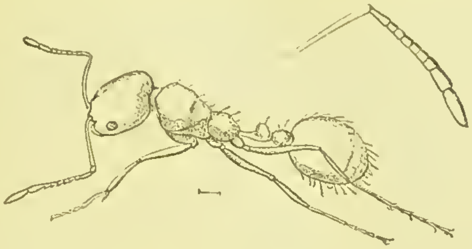

Fig. 64.—*Solenopsis geminata*, ☿ min.

shallow punctures and a few minute piligerous tubercles; the rest smooth and shining but not polished: pilosity moderately abundant, soft and long.

☿. Pale yellow to reddish yellow; the abdomen and the borders of the mandibles marked with brown. Entirely smooth, shining and polished.

♀. Similar in colour to the ♃, but of a slightly deeper tint; the apical margins of the abdominal segments transversely dark brown. Head, thorax and abdomen shining, with small, shallow, widely scattered punctures; pilosity as in the ♃; wings hyaline, nervures pale yellow.

♂. Dark reddish brown, the head rugulose, subopaque; the rest very smooth, shining and polished; wings as in the ♀.

For the rest of the characters of the species see detail of generic characters given above.

Length, ♃ 7–8; ☿ 3–4·5; ♀ 9–9·5; ♂ 5·5 mm.

Hab. Throughout our limits, and spread pretty nearly over the tropics of the two hemispheres.

Var. *rufa*, Jerdon, is a darker reddish yellow.

185. **Solenopsis wroughtoni**, *Forel, Rev. Suisse Zool.* x (1902), p. 214.

" ☿. Mandibles smooth, armed with 5 acute teeth, short and stoutly made. Head rectangular, constricted anteriorly, with the sides somewhat convex. Clypeus bicarinate and sub-bidentate. Eyes absent, or composed of a single facet situated in the anterior third of the sides of the head. Maxillary palpi 1-jointed. The scape extends up to the posterior two-fifths of the head. The last joint of the antennæ is as long as the 7 preceding joints united. Joints 2–6 of the flagellum 3 times thicker than long. Pro-mesonotum barely longer than broad. Meso-metanotal emargination narrow, but somewhat strongly impressed. Basal face of metanotum broader than long, terminated by two small elongate tubercles, on the carinæ prolonged along the length of the declivous face. First node of pedicel convex, below formed into a rounded cone, petiolate anteriorly; second node broader than long, much broader than the 1st. Legs short and thick. The anterior tibiæ only twice as long as they are broad. Somewhat densely

reticulate, opaque or subopaque. Front and sides of the head striate. On the vertex the striæ are interrupted and form elongate tubercles. Front in part smooth. Some striæ on the thorax. Abdomen and 2nd node of pedicel smooth. Almost entirely without erect hairs. A raised pubescence somewhat abundant on the body and legs. Reddish yellow, a little ferruginous. Abdomen and legs of a paler yellow." (*Forel.*)

Length, ☿ 1·3–1·4 mm.

Hab. Bengal: Orissa (*Taylor*). "A very aberrant species" (*Forel*).

I have seen only one specimen of this species; and that, in Mr. Wroughton's collection, is in spirits. It is impossible to examine it well without setting and staging. I have therefore preferred to quote Dr. Forel's full description.

186. **Solenopsis nitens**, sp. nov.

☿. Reddish brown; mandibles, antennæ and legs yellow. Head, thorax and abdomen smooth, polished and shining, without any sculpture; pilosity pale, sparse, most plentiful on the front and on the abdomen. Head proportionately rather large, rectangular, slightly emarginate posteriorly, sides not very convex, very much longer than broad; mandibles rather dull, subopaque, the masticatory margin very oblique, armed with 4 teeth, the apical tooth long and acute; clypeus convex, the two carinæ conspicuous, their apices acutely dentate, yellowish in colour; antennæ short, the scape not reaching the top of the head; eyes placed below the middle on the sides of the head. Thorax anteriorly very convex; the pro-mesonotum forms a prominent raised convexity, the posterior face of which slopes steeply back to the deeply-marked meso-metanotal suture; viewed in profile, the thorax is deeply emarginate at the suture; basal portion of metanotum strongly compressed, very much narrower than the front portion of the thorax, the apex truncate, the sides not triangularly produced at the posterior lateral angles as in *S. geminata*; legs rather slender. Pedicel elongate; the 1st node squamiform, rounded above, much broader than long, with a long petiole anteriorly; 2nd node rounded, as broad as long; abdomen oval.

Length, ☿ 1·2–1·5 mm.

Hab. Ceylon: Peradeniya near Kandy (*Green*).

Genus **PHIDOLOGITON.**

Ocodoma, pt., *Jerdon, Madr. Jour. L. S.* xvii (1851), p. 110.
Atta, pt., Pheidole, pt., and Solenopsis, pt., *Smith, Cat.* vi, 1858, pp. 164 & 174, *and Jour. Linn. Soc.* vi (1861), p. 48.
Phidologeton, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 750.

Type. *P. diversus*, Jerdon.

Range. Indo-Malayan region.

This genus is allied to and closely resembles *Phidole.* The

enormous, somewhat disproportioned head in the ♃, the form of the thorax, pedicel and abdomen are all very similar. It differs, however, as follows:—Antennæ of 11 instead of 12 joints in ♃, ☿ and ♀; club of the flagellum formed of the apical *two* instead of the apical three or four joints; *Phidologiton* ♀ has the thorax extraordinarily high, massive and gibbous; and between the very largest form of ☿ or ♃ and the ☿ *min.* are several forms that vary in size and also in the shape of the head.

Mr. Rothney, in his very interesting "Notes on Indian Ants" (Trans. Ent. Soc. 1889, p. 369), says that "these ants form their nests under bricks, stones, flower-pots, rock-works, or any spot offering shelter or shade of this nature." Two species occur in Burma, and are common round Rangoon. Nests can be found under the blocks of laterite road-material collected by the sides of roads for repairing purposes. I have found large and populous nests under stacks of bricks in a brickfield, under fallen logs in the jungle, and in the foundations of the pillars of our wooden bungalows in Burma. One large nest, which I vainly tried to clear out, was formed under my house in Moulmein. From this our rooms were periodically invaded by swarms, and every scrap of food they could find, and every living or dead insect of other kinds, cleared out. Often the ants seemed to move about aimlessly, looting nothing however temptingly accessible; but they generally gave us a lively time, for, stepping heedlessly into their columns, one's feet and legs were covered in a moment as it seemed by legions of little fiends biting with all their might. The giant soldiers, however formidable they look, are absolutely unable to give even a decent nip, but the bites of the smaller forms of soldiers and of ☿ *min.* are vicious and to be remembered. In a nest of these ants the workers far outnumber the various forms of soldiers. In India *Phidologiton* when on the march apparently always makes covered ways; in Burma this is not so. During the hundreds of times that I have come across this ant, I have only twice seen it tunnelling. Ordinarily it marches in the open in irregular columns of mixed workers and of the smaller forms of soldiers, and with only a very few of the giant soldiers marching very deliberately and keeping to one side of the rank and file. What was most remarkable was that these immense fellows were invariably being ridden by three or four of their smaller comrades. At intervals one of these would tumble off or possibly descend and join the column, but its place was always quickly taken by another.

When these ants take up their abode in any numbers near a village in the jungles they become a terrible nuisance. In the Thaungyin Valley, Tenasserim, I knew of a Karen village that had absolutely to shift because of the ants. No one could enter any of the houses day or night, or even pass through the village, without being attacked by them.

I have never been able to make out clearly what are the functions of the different grades of soldiers. The attack of the tiny

workers is far more ferocious and effective than that of the soldiers. As for the giants, they are useless as fighters, and beyond occasionally acting as "state elephants," as Mr. Aitken has somewhere humorously suggested, they appear, so far as I could see, to be of no use to the community. Mr. Rothney, however, records having seen them on one of their covered ways "very busy *not* carrying or building-up, but slowly making their way along the line, and here and there stopping and rearing themselves up against the walls, pressing together and smoothing out in a way that their great size gave them special facility for doing;" so after all they may be the trowels and rammers of the Ants' Public Works Department.

Key to the Species.

♃ ♃.

a. Length 4·5–13 mm.
 a′. Front of the head bearing a single ocellus in the middle .... *P. diversus*, p. 162.
 b′. Front without any ocellus .... *P. affinis*, p. 164.
b. Length under 4·5 mm. .... *P. nanus*, p. 165.

☿ ☿.

a. Colour dark chestnut-brown; length over 2·5 mm. *P. diversus*, p. 162.
b. Colour light brownish yellow; length under 2·5 mm.
 a′. Length 2–2·5 mm. Sides of the head smooth. *P. affinis*, p. 164.
 b′. Length barely 2 mm. Sides of the head finely rugose........................... *P. nanus* *, p. 165.

187. **Phidologiton diversus**, *Jerdon* (Ocodoma), *Madr. Jour. L. S.* xvii (1851), p. 109, ☿.
Pheidole ocellifera & taprobanæ, *Smith, Cat.* vi (1858), pp. 174, ☿, & 175, ♀.

♃ *max.* Dark chestnut-brown; mandibles nearly black; antennæ and legs more or less reddish brown; head anteriorly and thorax on the sides longitudinally striate, the posterior lobes of the head in front, the pronotum anteriorly and the basal portion of the metanotum transversely striate; the 1st node of the pedicel irregularly rugose, the rest of the insect smooth, shining and polished. Head rectangular, as broad in front as posteriorly, the sides straight, the posterior border widely emarginate, a deeply impressed medial narrow groove down the front, with a single large ocellus at the beginning of its lower third; mandibles large, nearly black, smooth, with a few shallow punctures,

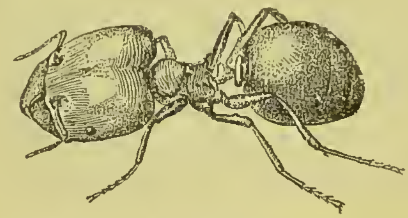

Fig. 65.—*Phidologiton diversus*, ♃.

* *P. lamellifrons*, Forel, p. 166, is not included in the key, only the ♀ being known.

the masticatory margin with two strong teeth at apex, and deep, short, longitudinal groovings on the upper side; clypeus narrow in the middle, slightly convex and produced between the base of the antennæ, its posterior margin clearly defined and rounded, its anterior margin transverse: antennal carinæ short, divergent; antennæ slender, pubescent; eyes small, round, placed about the middle of the sides of the head. Thorax: pro- and mesonotum convex, the pro-mesonotal suture lightly impressed, the scutellum gibbous and prominent; the metanotum depressed, the basal portion level, slightly concave, the metanotal spines erect, moderately long and stout; legs slender. Pedicel rather short; the 1st node thick in profile, subtriangular, its upper margin transverse and emarginate, beneath furnished with a stout broad keel: 2nd node from above transverse, its upper margin rounded, twice as broad as the 1st node; abdomen broadly oval.

♃ *min.* Resembles the ♃ *max.*; very much smaller, the head not bilobed, the posterior emargination barely indicated, the scutellum not prominent, the 1st node of the pedicel not emarginate above, the sculpture of the head and thorax much feebler, no striæ on the head posteriorly or on the pronotum.

Between the above two are intermediate forms, varying in size and a little in sculpture.

☿. More or less dark chestnut-brown, the thorax and abdomen often lighter in colour than the head; the mandibles, antennæ and legs yellowish brown; the head, thorax and abdomen smooth, polished and shining; the sides of the thorax posteriorly, and sometimes the basal portion of metanotum above, obsoletely rugulose.

♀. Resembles the ♃ *max.*, but darker, the antennæ and legs dark chestnut-brown. Head as in the ♃ *max.*, but entirely longitudinally striate, except a patch on either side of the large and conspicuous ocelli, which is punctured but shining; the head is not so deeply bilobed, and the mandibles more closely and coarsely punctured. Thorax smooth, shining, short, high and massive, almost as high as long; the pronotum depressed and vertical, the mesonotum slightly convex; the metanotum short, nearly vertical, slightly concave, transversely striate and opaque; the metanotal spines short and thick, directed backwards. Pedicel short and broad; the 1st node as in the ♃ *max.*, but opaque, broader above, more broadly emarginate, the appendix beneath forming a thick keel; the 2nd node shining, transverse and broad, the short posterior portion joining it to the abdomen thick; abdomen longer, broader and more massive than in the ♃ *max.* Wings dark yellowish brown, subhyaline; the nervures brown.

♂. Dark brown; the antennæ and legs pale reddish brown; mandibles, clypeus and lower anterior portion of head chestnut-brown. Head above finely longitudinally striate; thorax closely, finely punctured above, slightly shining; basal portion of metanotum longitudinally, apical portion transversely striate; abdomen smooth, slightly shining, with some irregularly-scattered piligerous tubercles. Pilosity tolerably dense, especially at the base of the

abdomen, pale reddish yellow and more or less recumbent. Head small; eyes and ocelli remarkably large; mandibles subtriangular, longitudinally striate, the masticatory margin with one large, broad, triangular apical tooth, very acute at apex, and widely divided from four smaller inner teeth; clypeus very convex; eyes and ocelli very large and prominent; antennæ filiform, the scape short, equal in length to the basal three joints of the flagellum. Thorax as in the ♀, but smaller and less massive; the scutellum very prominent and gibbous, the metanotum short and without spines. Pedicel short and thick, the nodes scarcely raised, attached to the abdomen by the whole posterior face of the 2nd node; abdomen broadly oval; the external genital laminæ broad and pale yellowish.

Length, ♃ 4·5–13; ☿ 2·5–3·5; ♀ 19–20; ♂ 13 mm.

Hab. Sikhim (*Möller*); Bengal (*Rothney*); Western India, Poona (*Wroughton*), Kanara (*Aitken*), Calicut, Travancore (*Rothney*); Burma and Tenasserim (*Fea & Bingham*). Extending into he Malayan subregion.

The type, a ♀, of *P. taprobanæ*, Smith, is in the British Museum collection, but though smaller, as Dr. Mayr long ago noted (Verh. zool.-bot. Ges. Wien, xxxv (1886), p. 360), there is absolutely no difference in form, sculpture, or colour from *P. diversus*.

188. **Phidologiton affinis**, *Jerdon* (Ocodoma), *Madr. Jour. L. S.* xvii (1851), p. 110, ♃ ☿.
Atta bellicosa. *Smith, Cat.* vi (1858), p. 164, ☿.
Solenopsis laboriosa, *Smith, Jour. Linn. Soc.* vi (1861), p. 48, ☿.
Solenopsis calida, *Smith, op. cit.* vii (1863), p. 22, ♀.

♃ *max.* Resembles *P. diversus*, but is not quite so large and massive; of a chestnut-red colour, polished and shining, the mandibles black, the antennæ and legs yellowish red; the sculpture is more feeble, and the medial longitudinal furrow less deeply impressed. Head proportionately much longer, with no central ocellus on the front; pedicel with the 1st node above narrower, more conical, and not emarginate above, the keel below less strongly marked.

♃ *min.* Resembles the ♃ *max.*; mandibles strongly dentate along the masticatory margin, broad and triangular. Thorax very wide and convex anteriorly, compressed and narrow posteriorly. Pedicel with the nodes smaller in every way; abdomen broadly oval.

As in *P. diversus*, the ♃ *max.* and ♃ *min.* are linked by forms intermediate in size and sculpture.

☿. Light brownish yellow, highly polished, smooth and shining; for the rest resembling the ☿ of *P. diversus*, but markedly smaller and slighter in every way.

♀. Resembles the ♃ *max.* closely, and is a much more slenderly built insect than *P. diversus* ♀. Bright chestnut-red, the antennæ and legs slightly paler. Head about as broad as long without the mandibles, quadrate, the occiput very slightly emarginate, some-

what finely longitudinally striate from end to end, with no smooth spot on each side of the ocelli; the striæ not or very little divergent posteriorly, breaking into reticulations on the posterior part of the head; mandibles smooth, shining, sparsely punctured on the basal three-fourths, more closely punctured along the masticatory margin. Thorax, pedicel and abdomen as in *P. diversus* ♀, but much smaller and more slender. Wings flavo-hyaline, not so dark as in *P. diversus*.

♂. Densely pubescent and very similar to *P. diversus* ♂, much smaller and slighter.

Length, ♃ 5–11; ☿ 2–2·5; ♀ 14–16; ♂ 10 mm.

Hab. Bengal (*Rothney*); Western India from Poona to Travancore (*Wroughton*, *Aitken*, *Ferguson*); Ceylon (*Yerbury*); Assam (*Long*); Burma (*Bingham*); Tenasserim (*Fea*, *Bingham*).

189. **Phidologiton nanus**, *Roger, Berl. ent. Zeit.* vii (1863), p. 191.

♃. Dull yellow, antennæ and legs paler, abdomen brownish yellow; head, thorax anteriorly and abdomen smooth and shining, head with a few fine striæ on the sides anteriorly, the metanotum finely punctured, opaque; pilosity pale, moderately abundant, long and erect. Head rectangular, longer than broad, convex, posteriorly slightly emarginate, the posterior lateral angles not prominent; mandibles comparatively large, somewhat brownish, not shining; clypeus broad, its posterior margin medially broad and rounded, anteriorly transverse; antennal carinæ very short, wide apart; antennæ short, the scape not reaching more than halfway from its insertion to the top of the head; eyes very small, somewhat prominent. Thorax broad anteriorly, with the lateral angles prominent, constricted posteriorly; the basal portion of the metanotum depressed, level; metanotal spines short and acute; legs comparatively long, with erect pilosity. Pedicel somewhat elongate, the 1st node conical, the 2nd node broader than the 1st and elongate, longer than broad; abdomen oval.

☿. Very similar to the ♃, but smaller, the head very slightly emarginate posteriorly, the posterior lateral angles rounded. Thorax: the pronotum broad, rounded anteriorly and slightly convex, the lateral angles more obtuse than in the ♃. Sculpture and pilosity very similar to that of the ♃.

" ♀. Dark to clear bright reddish brown. Legs lighter, short and moderately pilose. Head slightly, thorax more, and abdomen strongly shining. Head almost as broad as the thorax without the mandibles, nearly quadrangular, posteriorly somewhat rounded and lightly medially impressed along its length. Eyes and ocelli large. Antennæ as in the ☿. Mandibles smooth, with a few punctures, the base with longitudinal striæ, anteriorly with 2 strong teeth, posteriorly sometimes with 2 smaller teeth. The head is very strongly longitudinally striate or longitudinally rugose, behind the eyes transversely striate, in places widely reticulate. The short depressed pronotum is transversely striate;

the mesonotum set with large elongate punctures. Scutellum shining. Metanotum transversely striate, with two short acute apical spines. The 1st node shortly petiolate in front, . . . 2nd node a little broader than long. Abdomen shining, plainly but not very thickly punctured. Femora rather thickened. The shining abdomen pilose. Front wing . . . with one discoidal and one cubital cell." (*Roger.*)

Length, ♃ 4; ☿ 1·8; ♀ 11–12 mm.

Hab. Ceylon.

190. **Phidologiton lamellifrons**, *Forel, Rev. Suisse Zool.* x (1902), p. 219, ♀.

"♀. Mandibles smooth, armed with 6 teeth, sparsely punctured. Clypeus not emarginate anteriorly, obtusely bicarinate, the carinæ widely divergent. Head rectangular, about one-fifth longer than wide. Each occipital angle forms a transverse rounded ridge, which is continued a little on to the sides and towards the middle, where it separates the vertex from the occiput, but becomes obsolete behind the ocelli. The frontal carinæ parallel, very long, wide apart, dilated in front into rounded reddish translucid lamellæ, which cover the articulation of the antennæ, as in many of the *Cryptoceri*, without being so lateral, but they are more raised and prominent. Scape clavate, short, scarcely extending beyond the middle of the head. Antennæ 11-jointed, the club of two joints. Thorax as broad as the head. Metanotum subcubical, armed with two dentiform tubercles, its two portions subequal, the vertical portion declivous. First node subsquamiform, emarginate above, with a broad petiole; second node rectangular, transverse. Head longitudinally striate, except the occiput posteriorly and the clypeus, which are smooth like the rest of the body. Metanotum reticulate. Erect pilosity yellowish, unequal, abundant on the body, very oblique on the tibiæ and scape. Pubescence very thin. Of a brownish-black; abdomen, legs, antennæ, mandibles and frontal carinæ of a reddish or brownish yellow. Wings pubescent, clouded with brownish." (*Forel.*)

Length, ♀ 4·5–4·6 mm.

Hab. Recorded so far from Belgaum only (*Wroughton*). Unknown to me.

Genus MERANOPLUS.

Cryptocerus, *Guér.* (*nec Latr.*) *Cuv. Iconogr. Regne Anim., Ins.* iii (1838), p. 424.
Meranoplus, *Smith, Trans. Ent. Soc.* ser. 2, ii (1854), p. 224.

Type, *M. bicolor*, Guér., from India.

Range. Indo-Malayan, Australian and Ethiopian regions.

☿. Head trapezoidal, broader posteriorly than in front, the front of the head from the posterior margin of the clypeus bent downwards, subtruncate; sides of the head slightly compressed,

deeply grooved above the eye for the reception of the antennæ, which fold back into the groove and when so folded are invisible from above; mandibles stout, the masticatory margin armed with 4 teeth; clypeus with the median portion broad, posteriorly well defined, frontal area triangular, depressed, and at times obscure; antennal carinæ short, very widely separated, continued as lines along the upper border of the antennal groove; antennæ of moderate size and thickness, 9-jointed, the club distinct, formed of the apical three joints; eyes oval, always somewhat prominent. Thorax above more or less square in form, the pro- and mesonotum with no vestige above of a suture between them, more or less armed laterally and posteriorly with spines or teeth; metanotum depressed beneath the overhanging posterior portion of the pro-mesonotal shield, vertical, armed at its upper or anterior angles with two backward-pointing spines; legs somewhat short and stout, posterior tibiæ with a single fine, simple, non-pectinate calcar. Pedicel short, nodes large, sessile or only shortly petiolate; 1st node more or less conical; 2nd globose, in some species flattened anteriorly; abdomen cordate, lightly concave in front.

♀. Differs from the ☿ in being larger, with a proportionately smaller, rounder head, and immensely more massive, elongate, oval abdomen. The antennæ are 10-jointed, and the pro- and mesonotum of the thorax are without spines; fore wing with a large radial, a long cubital, and a discoidal cell.

♂. Much smaller and slighter; head with enormous eyes and ocelli and 13-jointed antennæ, the scape or 1st joint short, about as long as the 2nd joint of the flagellum; thorax without spines; pedicel long, nodes simply indicated by a cylindrical thickening; abdomen cordate.

Key to the Species.

A. Pro-mesonotal shield undivided and square, the four angles produced into very long and acute spines .... *M. mucronatus*, p. 168.

B. Pro-mesonotal shield undivided, but differently armed.

a. Mesonotum armed posteriorly with two long acute spines; pronotum dentate .... *M. bicolor*, p. 168.

b. Mesonotum armed posteriorly with only comparatively short teeth.

a′. Second node of pedicel with a medial tooth above pointing backwards ...... *M. belli*, p. 169.

b′. Second node of pedicel without such tooth, rounded posteriorly.

a^2. Abdomen finely reticulate, subopaque. *M. rothneyi*, p. 170.

b^2. Abdomen highly polished, smooth, and shining .... *M. læviventris*, p. 170.

191. **Meranoplus mucronatus**, *Smith, Jour. Linn. Soc.* ii (1857), p. 82, pl. 2, fig. 6, ☿.

☿. Dark ferruginous red, scape of the antennæ, antennal grooves, margins of the pro-mesonotal shield and legs yellowish; pilosity short, fairly abundant, yellowish red in colour. Head, thorax above, and nodes of the pedicel roughly sculptured; frontal area, antennæ and antennal grooves, sides of the thorax, the metanotum and legs smooth and shining; abdomen closely, very distinctly reticulate-punctate, opaque. Head a little longer than broad, convex; mandibles and clypeus longitudinally striate; frontal area depressed but distinct; eyes comparatively small, antennal grooves and antennæ characteristic of the genus. Thorax: the pro-mesonotal shield square, with a semitransparent lamellar process between the long spines arming each angle of the square; two short processes between the posterior two spines, each process divided at apex into two or three acute little spines; metanotum narrowed, concave, vertical, bilaterally carinate, the carinæ ending above in a long slender curved spine; legs long, robust. Pedicel: the 1st node squamate, pentagonal, viewed from the side triangular; 2nd node flat in front, rounded and sloping posteriorly; abdomen convex, cordate, acuminate at apex.

Length, ☿ 6 mm.

Hab. Lower Burma, Pegu Yoma (*Bingham*).

I only once came across this species. It appears to be rare.

192. **Meranoplus bicolor**, *Guér.* (Cryptocerus) *Cuv. Iconogr. Règn. Anim., Ins.* iii (1838), p. 425; *Smith, Trans. Ent. Soc. Lond.* 1875, p. 34, pl. i, figs. 1–3, ☿ ♀ ♂.

? Meranoplus dimicans, *Walker, A. M. N. H.* (3) iv (1859), p. 375, ☿

? Meranoplus villosus, *Motsch. Etud. Entom.* viii (1859), p. 115, ♀.

☿. Head, thorax, legs and pedicel of the abdomen bright ferruginous red, abdomen black; pilosity very long, soft, abundant and of a grey colour; head and thorax above and the 2nd node of the

Fig. 66.—*Meranoplus bicolor*, ☿. *a*. Head.

pedicel coarsely sculptured, cribrate; sides of the thorax punctured, opaque; the antennal groove within and the metanotum smooth; scape of antennæ and legs sparsely, flagellum finely and

closely punctured, with oblique pubescence; abdomen closely and finely reticulate, more or less opaque. Head a little longer than broad and broader posteriorly than in front; mandibles rather narrow, obscurely striate and pubescent; clypeus convex in the middle, inclined downwards, smooth and obscurely bicarinate; frontal area depressed, well defined. Thorax: the pro-mesonotal shield about as broad as long, with the anterior angles prominent and acute, the sides posteriorly with a small incision, and beyond that produced backwards into a long, somewhat laminate spine, on each side overhanging the metanotum; the latter vertical, slightly concave, with a carina on each side ending above in an acute spine; legs moderately long. Pedicel: the 1st node smooth, viewed from the side triangular, the apex bevelled; 2nd node globose; abdomen cordate.

♀. Resembles the ☿ in colour and form, but is of course larger, with the pronotum vertical, not forming part of the dorsum; mesonotum and scutellum large; metanotum as in the ☿. The pronotum has the anterior shoulders prominent, scarcely dentate; the mesonotum is wholly without spines, and the metanotal spines are more robust than in the ☿.

♂. Pale testaceous or whitish yellow all over; pilosity abundant and long, as in the ☿; head and thorax finely punctured, opaque; abdomen shining. Thorax: the mesonotum gibbous, convex, with a medial, longitudinally impressed, shining line. For the rest the characters as in the genus.

Length, ☿ 4–5; ♀ 7–8; ♂ 3–3·5 mm.

Hab. Pretty nearly throughout our limits, avoiding only the hot dry plains in the North Western Provinces, Punjab, and Central India. Common throughout Burma and Tenasserim, and extending to the Malayan subregion.

193. **Meranoplus belli**, *Forel, Rev. Suisse Zool.* x (1902), p. 240, ☿.

☿. Head with the antennæ and the legs dusky brown; thorax and pedicel of the abdomen reddish brown, abdomen more or less dark brownish yellow; pilosity dusky brown, very dense, shorter than in *M. bicolor*. Head: the pro-mesonotal shield of the thorax and the pedicel of the abdomen opaque, punctured in places, having the appearance of longitudinal striæ in certain lights, the puncturing much finer than in *M. bicolor*; antennæ, sides of the thorax, the metanotum and legs more sparsely punctured, subopaque; abdomen more or less smooth, but dull, with very minute and fairly plentiful punctures. Head nearly square, convex in front; mandibles proportionately broader than in *M. bicolor*, striate; clypeus medially concave, striate, bicarinate; antennal grooves much broader proportionately than in any other Indian species of the genus, smooth within. Thorax: the pro-mesonotal shield broader than long, the anterior angles acutely dentate, posteriorly at the lateral angles armed with two laminate, moderately long, acute spines; metanotum bicarinate, armed with

two slender, somewhat curved spines; legs as in *M. bicolor*. Pedicel: the 1st node cuneiform, transversely acute above, sometimes bidentate; 2nd node globose, armed posteriorly above with a distinct rather thick tooth pointing backwards; abdomen more massive than in any other Indian species, cordiform.

Length, ☿ 4–4·5 mm.

Hab. Western India, Kanara (*Bell & Wroughton*).

194. **Meranoplus rothneyi**, *Forel, Rev. Suisse Zool.* x (1902), p. 241, ☿.

"☿. Mandibles striate, armed with 4 teeth. Clypeal carinæ less wide apart than in *M. belli*. Frontal area striate, indistinct. Head as long as broad, trapeziform, constricted anteriorly, its posterior margin convex. Eyes large, placed in the posterior third of the head. Scape incrassate along the apical half. Promesonotal suture absent, the pronotal angles acute, subdentiform; pro-mesonotum nearly square, a little compressed posteriorly, margined laterally with a lamellate border, rectilinear, without teeth, spines, or emargination, and terminating posteriorly in two teeth, broad and long, flattened, horizontal and obtuse; between the two teeth is a wide semicircular emargination, and in the middle of the emargination a small secondary incision. The posterior margin of the mesonotum also emarginate, forming a lamellate carina overhanging the metanotum. The latter has only a subvertical surface, bordered laterally by carinæ which are armed in the middle with a slender pointed spine longer than half the metanotum. First node of the pedicel squamiform, very slightly conical; 2nd node twice as broad as long, as broad as the 1st node. Abdomen oval, emarginate and somewhat submargined anteriorly. Shining, longitudinally striate. The striæ are reticulate, especially on the thorax and pedicel, little prominent or regular. Metanotum transversely striate. Abdomen finely reticulate, slightly subopaque. Pilosity pale yellow as in *M. belli*. Yellow, slightly reddish. Abdomen clear brown. Legs and scape of the antennæ yellow.

"*Length*, ☿ 2·5–2·8 mm." (*Forel*.)

Hab. Recorded so far from Cochin only (*Rothney*).

In Mr. Rothney's fine collection of Indian ants, kindly lent to me, there are two specimens of this very distinct species. Unfortunately both specimens have been rather besmeared with gum in mounting, rendering it difficult to make out the sculpture; I have preferred therefore to quote Dr. Forel's original description of the species.

195. **Meranoplus læviventris**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 506, ☿, pl. 10, fig. 16.

☿. Head, thorax, legs and pedicel of the abdomen dark reddish ferruginous, abdomen clear pellucid brown to dark chestnut-brown; pilosity soft, abundant, long, but not so long as in *M. bicolor*, and somewhat sparser on the abdomen. Head, pro-mesonotal shield

and both nodes of pedicel above coarsely sculptured, rugose; sides of the thorax punctured; metanotum smooth and shining; abdomen smooth, highly polished. Head a very little longer than broad, and as broad in front as posteriorly; mandibles narrow, obscurely striate: clypeus depressed, not convex, smooth in the middle; antennal grooves very deep and smooth within; antennæ short and stout. Thorax: the pro-mesonotal shield, seen from above, almost semicircular, armed with six stout spinous teeth, the pronotal portion much wider than long; metanotum as in *M. bicolor*, smooth, slightly concave, bicarinate, the carinæ ending above in slender spines pointing backwards; legs as in *M. bicolor*. Pedicel: the 1st node cuneiform or cone-shaped, obliquely truncate above, the 2nd node globose; abdomen broadly cordate, convex, remarkably smooth and shining.

Length, ☿ 3·5 to nearly 4 mm.

Hab. Throughout Burma and Tenasserim up to 5000 feet elevation (*Fea*, *Bingham*).

Emery gives the abdomen as black, but in no specimen that I procured is it more than a dark chestnut-brown. The shape of the thorax is very distinctive in this species.

Genus TRIGLYPHOTHRIX.

Tetramorium, pt., *Mayr, Verh. zool.-bot. Ges. Wien*, xx (1870), pp. 972 & 976, ☿.

Triglyphothrix, *Forel, Ann. Soc. Ent. Belge*, xxxiv (1890), *C. R.* p. cvi.

Type, *T. walshi*, Forel, from India.

Range. Ethiopian and Indo-Malayan regions.

☿. Resembles the ☿ of the genus *Tetramorium*, Mayr, but is always shorter and more stoutly built. It can be recognized at once by its peculiar woolly appearance, arising from nearly all the hairs being trifid above the base. Mandibles and clypeus as in *Tetramorium*; antennæ * 12-jointed, the club of the flagellum of three unequal joints; antennal carinæ long, wide apart at base and divergent, bordering the antennal groove above the eyes, which groove is longitudinally divided by a low but distinct carina for the reception, on one side of the latter, of the scape, and, on the other, of the flagellum when folded. Thorax somewhat as in *Tetramorium*, with metanotal spines and metasternal teeth, the thoracic sutures, however, more or less obsolete; legs somewhat short and stout. Pedicel rather short, the nodes broad and a little flat above, the 1st node shortly petiolate anteriorly; abdomen oval.

♀. Very closely resembles the ☿, but larger; fore wing with a single open radial cell. The transverse nervure joins the cubital nervure at the point where it forks.

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* In one Indian species 10-jointed.

Key to the Species.

a. Antennæ 12-jointed.
  a. First node of pedicel distinctly transverse, much broader than long.
    a'. Head much narrowed anteriorly; petiole of 1st node of pedicel nearly as long as node .... *T. walshi*, p. 172.
    b'. Head nearly square, not narrowed anteriorly; petiole of 1st node of pedicel short, barely half the length of node.... *T. musculus*, p. 173.
  b. First node of pedicel as long as, or distinctly longer than broad, not transverse.
    a'. Mandibles finely longitudinally striate .. *T. striatidens*, p. 173.
    b'. Mandibles smooth or slightly punctured, not striate.
      *a*². Second node of pedicel closely punctured, opaque .... *T. obesa*, p. 173.
      *b*². Second node of pedicel smooth and shining, not punctured nor opaque .. *T. orissana*, p. 174.
b. Antennæ 10-jointed .... *T. decamera*, p. 174.

196. **Triglyphothrix walshi**, *Forel, Ann. Soc. Ent. Belge*, xxxiv (1890), *C. R.* p. cvii, ☿ ♀.

☿. Dull brown, abdomen darker, almost black; mandibles, antennæ and legs dull brownish yellow; head, thorax, pedicel and basal half of abdomen very finely and closely longitudinally punctured and reticulate, opaque, in certain lights appearing striate; pilosity very dense and woolly, whitish in colour, and somewhat concealing the sculpture. Head trapeziform, broader posteriorly than in front, slightly emarginate posteriorly; mandibles punctured, with a few coarse striæ; frontal area and medial longitudinal groove on the front absent; antennæ short, the scape not reaching the top of the head; antennal grooves broad and shallow, slightly shining; eyes placed in the middle of the sides of the head and a little to the front. Thorax short and broad, shorter than the head, curved and convex above; the metanotal spines subtriangular and acute at apex, pointing obliquely back; apical portion of metanotum shining, laterally carinate. Pedicel: the nodes transverse, much longer than broad, the 1st node petiolate anteriorly, the petiole nearly the length of the node; abdomen oval.

"♀. Basal area of metanotum nearly vertical, shining, longitudinally rugose. Mesonotum rugose, longitudinally reticulate. Striate portion of the abdomen shorter than in the ☿; the remainder of the abdomen is covered with fine sparse piligerous punctures, more distinct than in the ☿. Thorax short, a little narrower than the head. Abdomen small. Wings almost hyaline, faintly tinged with yellow, finely pubescent. Nervures and stigma pale. For the rest, identical with the ☿." (*Forel.*)

Length, ☿ 2–2·5; ♀ nearly 3 mm.
Hab. Recorded from Bengal (*Walsh*) and Western India (*Wroughton*).

197. **Triglyphothrix musculus**, *Forel, Rev. Suisse Zool.* x (1902), p. 239.

☿. Closely resembles *T. walshi*, darker, but identical in sculpture and pilosity. The head is shorter, nearly square, the scape and legs are proportionately much shorter, the metanotal spines shorter and more stoutly built. The pedicel has the nodes transverse, broader than long, but proportionately longer than in *T. walshi*, while the petiole of the 1st node is very distinctly shorter than in that species.
Length, ☿ 2 mm.
Hab. The Nilgiris (*Wroughton*).

198. **Triglyphothrix obesa**, *Er. André* (Tetramorium), *Rev. d'Ent.* vi (1887), p. 294.

☿. Head, thorax and pedicel a light orange-brown, abdomen clear bright brown; head, thorax and pedicel densely, rather coarsely punctured, rugose and opaque; abdomen polished, smooth and shining. Head, thorax and abdomen covered with an even, long, soft dense whitish pilosity. Head very convex, broader posteriorly than in front, the occiput slightly emarginate, the sides convex; mandibles triangular, smooth, but rather dull, punctured; clypeus rather broad, obscurely carinate down the middle, anteriorly somewhat rounded; antennæ rather thick, the scape short, not reaching the top of the head; the antennal carinæ wide apart, long, divergent; the antennal groove wide and rather shallow. Thorax broad and rounded in front, slightly narrowed posteriorly; the metanotal spines comparatively long and slender, suberect; metasternal teeth very small. Pedicel short; the 1st node from above ovato-rectangular, a little longer than broad, anteriorly shortly petiolate; the 2nd node smaller and lower, from above nearly circular; abdomen very broadly oval, rather obtuse anteriorly.
Length, ☿ 2·5–3 mm.
Hab. Bengal (*Rothney*); Western India, Bombay and Kanara (*Wroughton*).

199. **Triglyphothrix striatidens**, *Emery*.
Tetramorium obesum, *André*, *race* striatidens, *Emery*, *Ann. Mus. Civ. Gen.* xxvii (1889), p. 501.

☿. Very closely resembles *T. obesa*, Er. André, but differs constantly, both in Indian and Burmese specimens. The Indian specimens are slightly smaller, lighter in colour, of a brighter orange-brown than *T. obesa*, and have the mandibles finely, regu-

larly, rather closely longitudinally striate; the sculpture of the head and thorax is much feebler; the 2nd node of the pedicel very nearly smooth and shining, as in *T. orissana*, but not so small.

Length, ☿ 2·5 mm.

Hab. Sikhim (*Möller*), Gujerat, Champaner (*Wroughton*); Ceylon (*Green*); Burma (*Fea & Bingham*).

200. **Triglyphothrix orissana**, *Forel.*

Triglyphothrix striatidens, *race* orissana, *Forel, Rev. Suisse Zool.* x (1902), p. 239, ☿.

☿. Resembles *T. striatidens*, Emery, but the head is striate, and the sculpture altogether is feebler. Reddish yellow, the abdomen posteriorly brown; pilosity shorter and more sparse than in *T. striatidens*. Head rectangular, very convex on the front, the posterior margin very slightly emarginate; mandibles triangular, smooth, the masticatory margin denticulate; clypeus broad, transverse anteriorly; antennæ short and thick, the scape not reaching the top of the head. Thorax less convex than in *T. striatidens*, with the metanotal and metasternal spines more slender and shorter. Pedicel: the 1st node shorter than in *T. striatidens*, as broad as long; the 2nd node transverse, broader than long; abdomen broadly oval, more obtuse and rounded in front than posteriorly.

Length, ☿ nearly 2 mm.

Hab. Recorded from Bengal, Orissa (*Taylor*).

201. **Triglyphothrix decamera**, *Forel, Rev. Suisse Zool.* x (1902), p. 240, ☿.

♀. Reddish brown, antennæ and legs yellowish; the head, thorax and pedicel punctured, rugose, subopaque only, slightly shining; abdomen smooth and shining; pilosity abundant, long, of a pale whitish-yellow colour. Head nearly square, without the mandibles a little longer than broad, the posterior margin distinctly convex; mandibles large, triangular, punctured. Clypeus: the medial portion slightly convex, the anterior margin transverse; antennæ short and thick, the scape not extending to the top of the head; the antennal groove short and narrow, for reception of the scape only; eyes large, placed below the middle on the sides of the head. Thorax: the mesonotum and scutellum broad, only slightly convex; the metanotum without spines, the apical portion with two carinæ, ending below in small but distinct teeth. Pedicel from above: the 1st node quadrate; the 2nd node broader than the 1st and nearly twice as broad as long, rounded above; abdomen short, broadly oval.

Length, ♀ a little over 3 mm.

Hab. Recorded from Kanara (*Aitken*).

Genus TETRAMORIUM.

Formica, pt., *Linn. Syst. Nat.* ed. 10 (1758), p. 581.
Myrmica, pt., *Latr. Hist. Nat. Ins.* xiii (1805), p. 259.
Tetramorium, *Mayr, Verh. zool.-bot. Ges. Wien,* v (1855), p. 423.
Xiphomyrmex, *Forel, Mittheil. Schweiz. ent. Ges.* vii (1887), p. 385.
? Rhoptromyrmex *, *Forel, Rev. Suisse Zool.* x (1902), pp. 231 & 232.

Type, *T. cæspitum*, Linn., from Europe.
Range. Both hemispheres.

☿. Head generally more or less rectangular, with always a distinct posterior margin; mandibles broad, with from 5–7 teeth; maxillary palpi 4-, labial palpi 3-jointed; clypeus triangular, the apex posteriorly rounded between the bases of the antennæ, the anterior margin more or less transverse; antennal carinæ short, wide apart; antennæ stout, 11- or 12-jointed, club of flagellum formed of the apical three joints, which together are as long as the remainder of the flagellum; eyes rather small, lateral, round. Thorax short, often arched from front to back; pronotum seen from above broad anteriorly, with the anterior lateral angles prominent; thorax more or less narrowly emarginate at the meso-metanotal suture; metanotum armed at the posterior lateral angles of its basal portion with two spines or teeth; legs moderately stout. Pedicel: the nodes more or less rounded; the 1st node petiolate anteriorly, the front curved inwards; 2nd node generally a little broader than the 1st; abdomen oval.

♀. Closely resembles the ☿, but is much larger; the head, pedicel and abdomen as in the ☿, the last more massive and longer. Thorax massive, deep, with the mesonotum gibbous, convex; metanotum armed with two spines posteriorly as in the ☿, but stouter. Fore wing with one cubital and one discoidal cell.

♂. Head much smaller than in the ♀, eyes and antennæ large and prominent; mandibles flat, the masticatory margin dentate; antennæ 10-jointed, the scape short, not longer than the 2nd joint of the flagellum. Thorax short and massive, the disc of the mesonotum slightly convex, with two impressed lines converging posteriorly; metanotum truncate posteriorly and bidentate.

Key to the Species.

A. Antennæ 12-jointed.
  a. First joint of pedicel with an appendix beneath.
    a'. Head and thorax shining, very feebly longitudinally striate .... *T. wroughtoni*, p. 177.
    b'. Head and thorax subopaque, densely longitudinally striate, reticulate between striæ .... *T. rothneyi*, p. 177.

* Beyond the casual allusion to this genus or subgenus as quoted above, I cannot find it characterized in any publication.

b. First joint of pedicel without any appendix beneath.

a'. Clypeus not carinate or toothed.

a^2. First node of pedicel distinctly longer than broad.

a^3. Head and thorax blackish brown; metanotal spines very short, barely a quarter of the length of the space between their bases . *T. christiei*, p. 178.

b^3. Head and thorax more or less rusty red; metanotal spines longer, as long as, or longer than the space between their bases.

a^4. Metanotal and metasternal spines subequal .... *T. coonoorense*, p. 178.

b^4. Metanotal spines distinctly longer than metasternal spines.

a^5. Metanotal spines very long, more than half length of thorax and strongly bent inwards.................. *T. curvispinosum*, p. 179.

b^5. Metanotal spines shorter, divergent, not bent inwards .... *T. curtulum*, p. 180.

b^2 First node of pedicel as broad as, or broader than long.

a^3. No metasternal spines .... *T. salvatum*, p. 180.

b^3. Metasternal spines or teeth present.

a^4. Metanotal spines reduced to 2 short upturned points or teeth .... *T. nursei*, p. 181.

b^4. Metanotal spines longer.

a^5. Head coarsely striate, opaque. *T. mixtum*, p. 182.

b^5. Head shining, finely striate; striæ wide apart .... *T. fergusoni*, p. 182.

b'. Clypeus either carinate or toothed.

a^2. Clypeus with two short obtuse teeth. *T. transversarium*, p. 183.

b^2. Clypeus not toothed.

a^3. No antennal furrow .... *T. inglebyi*, p. 183.

b^3. Antennal furrow distinct.

a^4. First node of pedicel distinctly longer than broad.

a^5. Thorax above only slightly convex, laterally margined; the sides compressed and vertical .... *T. guineense*, p. 184.

b^5. Thorax rounded and convex above, not margined; the sides not compressed or vertical .... *T. scabrum*, p. 185.

b^4. First node of pedicel as broad as, or a little broader than long .. *T. simillimum*, p. 185.

B. Antennæ 11-jointed.

a. First node of pedicel longer than broad.

a'. Spines very long, as long as, or longer than half length of thorax.

a^2. Meso- and metanotum obtusely margined .... *T. pilosum*, p. 186.

b^2. Meso- and metanotum rounded and convex, not margined .... *T. yerburyi*, p. 187.

b'. Spines shorter, about as long as the basal portion of metanotum .... *T. tortuosum*, p. 188.

b. First node of pedicel as broad as, or broader than long .... *T. smithi* *, p. 188.

202. **Tetramorium wroughtoni**, *Forel* (Rhoptromyrmex), *Rev. Suisse Zool.* x (1902), p. 231.

☿. Brownish yellow, antennæ and legs yellow; in some specimens a dark brown transverse mark on the abdomen; head and thorax lightly and finely longitudinally striate, the nodes of the pedicel delicately rugulose; abdomen smooth, highly polished and shining; pilosity pale, very sparse and short, pubescence almost entirely absent. Head without the mandibles trapezoidal, very much broader posteriorly than in front; mandibles triangular, very broad at the masticatory margin, very minutely longitudinally striate; clypeus convex, its anterior margin arched, posterior margin well defined, broadly rounded in the middle between the base of the antennæ; antennal carinæ wide apart, produced as fine striæ nearly to the top of the head, bordering a space very finely rugulose but not striate nor forming a groove for the reception of the scape of the antennæ; antennæ rather thick and comparatively long, the scape extending quite up to the top of the head; eyes round, placed a little above the middle of the sides of the head. Thorax comparatively short, broad and convex anteriorly, constricted at the mesonotum; pro-mesonotal suture obsolete; meso-metanotal suture distinct, the anterior margin of the metanotum a little raised behind the suture, basal portion of metanotum transverse and very short, posterior to it a broad groove divides the two short, stout, acute, divergent metanotal spines; the femora and tibiæ of the legs only slightly incrassate in the middle. Pedicel short, the nodes large; the 1st node rounded above, broader than long, anteriorly with a short petiole bearing an appendix beneath; 2nd node transverse, broader than the 1st node, more than twice as broad as long; abdomen oval.

♂. "Brownish; metanotum with 2 short spines. Wings subhyaline." (*Forel.*)

Length, ☿ 2·5; ♂ 2·8 mm.

Hab. Western India, Kanara (*Wroughton*); Upper Burma, Bernardmyo, 6000 ft. (*Bingham*).

203. **Tetramorium rothneyi**, *Forel.*

Rhoptromyrmex wroughtoni, *race* rothneyi, *Forel, Rev. Suisse Zool.* x (1902), p. 232.

☿. Closely resembling *T. wroughtoni*, Forel, with the head and the pedicel of the same form, but is of a more brownish and darker yellow than that species. Head and thorax very closely and

* *T. belgaense*, Forel, p. 189, described from a ♀, cannot be entered in the key.

finely striate, subopaque, with minute reticulations between the striæ; abdomen smooth and shining; pilosity pale, very sparse. Mandibles very finely longitudinally striate at the base; clypeus slightly impressed; antennæ as in *T. wroughtoni*. Thorax much as in that species, but the metanotal spines shorter. Pedicel: the 1st node with a shorter appendix beneath; 2nd node not quite so broad as in *T. wroughtoni*; abdomen oval.

Length, ☿ 2–2·3 mm.

Hab. Southern India, Bangalore (*Rothney*).

A barely separable race of *T. wroughtoni*, Forel.

204. **Tetramorium christiei**, *Forel, Rev. Suisse Zool.* x (1902), p. 232.

☿. Dark brown or black; mandibles, antennæ and legs light reddish brown; head and thorax somewhat finely longitudinally striate, the striæ slightly broken and reticulate, more so on the thorax, especially posteriorly, where the metanotum has the appearance of being transversely rugose; pedicel and abdomen smooth, polished and shining; pilosity pale, somewhat sparse, on the antennæ and legs it is oblique or recumbent and very short. Head without the mandibles seen from the front rectangular, transverse, posteriorly longer than broad; mandibles finely longitudinally striate, triangular, the masticatory margin dentate, broad, subequal with the inner margin; clypeus with the middle portion convex, the posterior margin well-defined, the anterior margin arched; antennal carinæ wide apart, prolonged back almost to the vertex, the antennal hollows for reception of scape very shallow, finely reticulate; antennæ somewhat short, the scape not reaching the top of the head; eyes lateral, placed below the middle of the head. Thorax elongate and narrow, convex, without an emargination above; pro-mesonotal suture obsolete; meso-metanotal suture slightly impressed; basal portion of metanotum short, with a slender erect slightly recurved short spine at the posterior lateral angles. Pedicel elongate, the nodes rounded, slightly longer than broad; the 2nd node a little broader than the 1st, this latter with an elongate petiole in front; abdomen oval, convex, somewhat truncate anteriorly.

Length, ☿ 3 mm.

Hab. Recorded from Sikhim; Darjeeling, 7000 ft. (*Christie*), Tukvar, 4000 ft. (*Möller*).

205. **Tetramorium coonoorense**, *Forel, Rev. Suisse Zool.* x (1902), p. 237, ☿.

☿. Head dull brown; mandibles, antennæ, thorax, legs and pedicel ochraceous yellow, the thorax and legs of a brighter tint than the mandibles and antennæ; abdomen dark castaneous brown, almost black; head, thorax and pedicel very closely and somewhat coarsely reticulate, the reticulations flat, the head in certain lights appearing longitudinally striate; legs and abdomen smooth, the latter highly polished and shining; pilosity pale, very

fine and soft and tolerably abundant, on the scape of the antennæ and on the tibiæ of the legs it is shorter and oblique. Head without the mandibles almost rectangular, a very little broader posteriorly than in front and distinctly longer than broad; mandibles subtriangular, the masticatory margin minutely denticulate; clypeus with the middle portion broad, rounded posteriorly, anteriorly slightly curved downwards; antennæ short and thick, the scape barely extending to the top of the head; eyes large, round, placed about the middle of the sides of the head. Thorax broad and convex anteriorly, with the anterior lateral angles rounded, narrowed posteriorly; the pro-mesonotal suture obsolete; the meso-metanotal suture visible but not impressed; the basal portion of the metanotum sligbtly sloping, the metanotal spines short, thick, erect. Pedicel short, the 1st node pear-shaped, the 2nd node transversely oval; abdomen broadly oval.

♀. "Black; abdomen brown; legs, antennæ and mandibles reddish. Mesonotum striate, with large scattered punctures. Head reticulate, not so striate as in the ☿. First node shorter, broader than long. For the rest as in the ☿." (*Forel.*)

Length, ☿ 2·5; ♀ 3 mm.

Hab. Recorded so far only from the Nilgiri hills (*Wroughton*).

206. **Tetramorium curvispinosum**, *Mayr, Termész. Füzetek,* xx (1897), p. 430, ☿.

"☿. Brownish red, pedicel and abdomen yellowish red, the latter in front somewhat brighter and in the middle browner; the mandibles, antennæ and legs yellow. Pilosity yellow, somewhat long over the whole body. The mandibles are densely longitudinally striate; head and thorax coarsely longitudinally striate, reticulate, with the finely reticulate-punctate meshes of the reticulations shining and somewhat smooth, the clypeus only longitudinally striate; the sides of the thorax are irregularly coarsely reticulate; the nodes of the pedicel with fine but shallow reticulations and some wrinkles on the sides, above somewhat smooth and shining.

"Head trapeziform, with plainly convex sides and moderately arched posterior margin. The clypeus with an anteriorly transverse, plainly truncate margin. Antennal carinæ prolonged by striæ to the top; antennal furrow for reception of scape of antennæ well-marked. Scape of the 12-jointed antennæ reaches up to the top of the head . . . ; eyes somewhere about the middle of the sides of the head. Thorax short, strongly arched, without sutures; the metanotal spines are stout, very long, nearly half the length of the whole thorax, springing near each other they are directed obliquely and upwards and are somewhat strongly bent inwards; the two teeth between which the articulation of the pedicel with the thorax lies are large and triangular, and have their bases connected with the bases of the metanotal spines by a carina on each side; between the carinæ lies the deep and narrow

truncate face of the metanotum. The 1st node of the pedicel has anteriorly a long petiole . . . . ; the node itself is rounded and plainly compressed, a little longer than broad; 2nd node somewhat broader than the 1st node, pyriform, very little longer than broad, constricted anteriorly. . . ." (*Mayr.*)

Length, ☿ 3·3 mm.

Hab. Ceylon, Kalewawa (*Madarász*).

207. **Tetramorium curtulum**, *Emery, Ann. Mus. Civ. Gen.* xxiv (1894), p. 471, ☿.

☿. Head, thorax and pedicel reddish ferruginous, mandibles, antennæ and legs yellowish, abdomen yellowish brown shaded with fuscous; head, thorax and nodes of the pedicel closely and coarsely punctured, granulate, opaque; abdomen smooth, polished and shining; pilosity pale, rather sparse and scattered. Head with the mandibles viewed from the front shield-shaped, the occiput transverse, the sides of the head convex but narrowing anteriorly; mandibles triangular, striate at base, the masticatory margin broad and dentate; clypeus slightly convex in the middle, its anterior margin transverse; antennal carinæ short, slightly divergent, continued up the head for about the length of the scape of the antennæ; these latter short and somewhat thick, the 2nd to the 8th joint of the flagellum transverse, the club distinct; eyes lateral, rather small, placed closer to the anterior than to the posterior margin of the head. Thorax broad and rounded anteriorly, narrowing posteriorly, the pro-, meso- and metanotum forming one elongate convexity rounded from side to side; the metanotal spines short and acute; legs short and stout, the femora and tibiæ incrassate in the middle. Pedicel short; the 1st node not petiolate, anteriorly longer than broad and longer than the 2nd node; the latter about as broad as long, both nodes about equal in width; abdomen elongate-oval.

Length, ☿ 2–2·5 mm.

Hab. Lower Burma, Palon (*Fea*); Pegu Yoma (*Allan*).

208. **Tetramorium salvatum**, *Forel, Rev. Suisse Zool.* x (1902), p. 235, ☿.

"☿. Mandibles striate, armed with 7 teeth. Head as in *T. simillimum*, but the sides more convex, very little constricted to the front. The eyes larger and more convex. There is no antennal furrow, only a finely-reticulate space by the side of the produced antennal carinæ for the reception of the scape. Pronotum not angular; thorax convex, rather short, not margined, without sutures or emargination. Metanotal spines as long as about two-thirds of the space between them. Declivous face margined by a carina; no metasternal spinules. First joint of the pedicel as in *T. simillimum*, but slightly more rounded. Second node narrowed anteriorly, broadened posteriorly, a little broader than long, and a little broader than the 1st node. Abdomen convex.

Head striate (the striæ reticulate); the thorax somewhat coarsely but irregularly and often superficially reticulate, in addition to the fine reticulations interspersed between. Pedicel rugose, except the summits of the nodes, which are more or less smooth. Abdomen smooth. Erect pilosity moderately abundant, on the body fine, the hairs pointed, rather long. The tibiæ of the legs and the scape of the antennæ with only a recumbent pubescence. Reddish yellow, abdomen dark brown. Legs yellowish." (*Forel.*)

Length, ☿ 2·3–2·4 mm.

Hab. North-west Himalayas (*Smythies*); Western India (*Wroughton*).

209. **Tetramorium nursei**, sp. nov.

☿. Brownish yellow, the head and abdomen darker than the thorax, almost brown, the mandibles, antennæ and legs lighter; smooth, polished and shining, a few light half-obsolete striæ on the front below the vertex and on the cheeks and the metathorax above, the sides minutely rugulose; pilosity pale yellow, somewhat sparse, the hairs obtuse at apex: on the scape of the antennæ and on the tibiæ of the legs it is a little more plentiful and much shorter. Head without the mandibles, seen from the front, almost square, as broad as long, posteriorly appearing transverse; mandibles finely longitudinally striate, much as in *T. christiei*; clypeus broad and convex anteriorly, bent down with the margin transverse, the posterior margin in the middle well

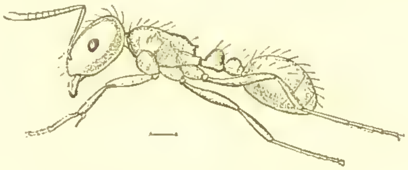

Fig. 67.—*Tetramorium nursei*, ☿.

defined; antennal carinæ short, not prolonged back as in *T. christiei*, no antennal groove, but the place where the scape rests, inwards from the eye, very minutely rugulose, but shining not opaque; antennæ somewhat short, the scape not quite extending to the top of the head; eyes lateral, very little below the middle of the head. Thorax convex, narrow, the pro-mesonotal suture obsolete, the meso-metanotal suture distinct, the basal portion of the metanotum curved a little from front to back, the posterior lateral angles without spines, barely subdentate. Pedicel proportionately shorter than in *T. christiei*, with the nodes distinctly higher and larger; the 1st node rounded, with a short petiole anteriorly; the 2nd node seen from above transverse, broader than long; abdomen broadly oval, the sides only slightly convex.

Length, ☿ 2·5–3 mm.

Hab. Recorded so far only from the North-West Frontier, Quetta (*Nurse*).

210. **Tetramorium mixtum**, *Forel, Rev. Suisse Zool.* x (1902), p. 236.

☿. Head, thorax and pedicel brownish red (sometimes the head dark brown or blackish), abdomen dark brown, almost black, legs more or less brownish yellow; head striate, reticulate between the striæ, especially posteriorly, thorax coarsely punctured and reticulate, longitudinally finely striate on the sides; nodes of pedicel punctured, opaque; abdomen smooth, polished and shining; pilosity pale, fairly abundant, especially on the head in front, on the antennæ and the tibiæ of the legs it is a little oblique. Head without the mandibles a little longer than broad, the sides convex, the head seen from the front posteriorly transverse; mandibles densely finely longitudinally striate, with a few small punctures interspersed; clypeus proportionately rather large, very convex, anteriorly transverse, its posterior margin well-defined, feebly arched between the bases of the antennæ; antennal carinæ wide apart, produced back as striæ bordering the space for the reception of the antennæ, which is not furrowed or grooved in any way; antennæ short and thick, but longer than in *T. inglebyi*, Forel, the scape reaching to about a quarter of its own length to the top of the head; eyes placed rather below the middle on the sides of the head. Thorax broad behind, sloping posteriorly and narrowly from the pronotum to the apex of the metanotum; sutures obsolete, no emargination; metanotal spines moderately short, thick and stout, somewhat wide apart. Pedicel: the 1st node longer than broad, rounded above, constricted in front and shortly petiolate; 2nd node semicircular posteriorly, transverse anteriorly, broader than the 1st node; abdomen oval, convex, broader in front than posteriorly.

Length, ☿ 2·5–3 mm.

Hab. The Nilgiris, Coonoor, Ootocamund (*Wroughton*).

211. **Tetramorium fergusoni**, *Forel, Rev. Suisse Zool.* x (1902), p. 234.

☿. Reddish or ferruginous yellow, the legs and abdomen a shade paler; head with some light longitudinal fine striæ wide apart from each other, closer on the anterior portion of the head, the disc of the thorax also with a few vague half-obsolete longitudinal striæ; the rest of the insect smooth and shining; pilosity rather sparse, the hairs very short and obtuse at apex, most plentiful on the scape of the antennæ and tibiæ of the legs. Head very short, a little broader posteriorly than in front, the cheeks very convex; mandibles slightly longitudinally striate; clypeus truncate and transverse anteriorly; antennal carinæ short, not produced backwards, no antennal furrows; antennæ short, the scape not reaching the top of the head by about one-third of its own length; eyes prominent, rather large, placed a little below the middle of the sides of the head. Thorax short, in profile appearing strongly arched from front to back; meso-metanotal suture

tolerably distinct; metanotal spines short, divergent, acute; posterior lateral angles of metasternum dentate. Pedicel: the nodes somewhat massive and high, the 1st node globose with a long petiole anteriorly; 2nd node much broader than the 1st, transverse in front, semicircular posteriorly and produced a little into cones at the sides; abdomen broadly oval, truncate anteriorly.

Length, ☿ 2·5 mm.

Hab. Recorded so far only from Travancore.

212. **Tetramorium transversarium**, *Roger, Berl. ent. Zeit.* vii (1863), p. 181, ☿.

"☿. Reddish, ferruginous, shining, with brownish-yellow mandibles, antennæ and legs; the pilosity is yellowish, fairly abundant and long. The head is shorter than in *T. guineense*, and the frontal lamellæ and frontal striæ are much shorter and more indistinct than in that species. The clypeus is lightly rounded in front and has on each side an obtuse tooth, ... in the middle carinate, often indistinctly longitudinally rugose. Mandibles longitudinally rugose, with black apex and teeth. Antennæ 12-jointed. Thorax above lightly arched, posteriorly a little constricted but without an impression, the anterior angles almost rounded. Metanotum with 2 long strong spines. The head is large and remarkably long; the thorax also massive, densely rugose. The first joint of the pedicel is in front somewhat thick, cylindrical, forming a node posteriorly, as broad as the metanotum, broader than long seen from above, anteriorly semicircular, posteriorly truncate, on the margins mostly bordered with black; the 2nd node is as broad as the 1st, much broader than long, and like the 1st node coarsely rugose. Abdomen oval, darker posteriorly."

Length, ☿ 2·5 mm.

Hab. "Ceylon" (*Roger*). Unknown to me.

213. **Tetramorium inglebyi**, *Forel, Rev. Suisse Zool.* x (1902), p. 233, ☿.

"☿. Mandibles striate, indistinctly denticulate. Clypeus feebly carinate, straight and finely crenulate owing to the recurved striæ on its anterior margin. Antennal carinæ short; no trace of an antennal furrow. Frontal area very small. Eyes small, placed below the middle of the sides of the head. The scape reaches a little into the posterior third of the head. Head rectangular, lightly concave posteriorly. The club of the antennæ thick, the apical joint longer than the preceding two united. Pronotum subangular in front, its anterior margin nearly straight. Thorax without sutures, somewhat convex from front to back, without an emargination, regularly narrowed from front to back, feebly submargined. Metanotal spines close together, thick, longer than the space between them, their apex curved forward. Two metasterna

spines rather long and very acute. First node subcubical, longer than broad, convex above, where it is scarcely broader posteriorly than in front, with a petiole anteriorly nearly as long as itself. Second node rounded, slightly broader than long and broader than the first node. Pilosity very fine, short, moderately abundant on the body, very oblique on the tibiæ and tarsi. Head coarsely striate, with reticulations between the striæ, finely reticulated at bottom and subopaque in front. Thorax coarsely but superficially reticulate, with the striæ on the middle of the mesonotum and the sides smooth. Sloping face of the metanotum between the two carinæ connecting the bases of the metanotal and metasternal spines, finely reticulate, also the sides of the nodes. The rest smooth and shining. Reddish ferruginous; legs, antennæ and spines yellowish. Abdomen of a brownish yellow." (*Forel.*)

Length, ☿ 2·4 mm.

Hab. Travancore. Described from a single specimen.

214. **Tetramorium guineense**, *Fabr.* (Formica) *Ent. Syst.* ii (1793), p. 357.

☿. Head, thorax and pedicel dull ferruginous red; abdomen brown, paling at the extreme base and on the 2nd and following segments, the apical margins of the abdominal segments yellowish; mandibles, antennæ and legs reddish yellow; head longitudinally striate, with some fine reticulations between the striæ; thorax and nodes of the pedicel somewhat coarsely reticulate and rugose; abdomen smooth, polished and shining, with vestiges of minute longitudinal striæ at the extreme base; pilosity pale yellow, fine and fairly abundant, especially on the front of the head, oblique and very short on the scape of the antennæ and the tibiæ. Head without the mandibles rectangular, half as long again as broad; mandibles as in *T. scabrum* but slightly narrower, smooth, slightly minutely punctured but not striate; clypeus longitudinally bicarinate in the middle, broad and somewhat convex; antennal carinæ wide apart and produced slightly divergently back nearly to the top of the head, bordering a well-marked antennal groove, which is sculptured within like the rest of the head; antennæ stouter than but similar to those in *T. scabrum*; eyes placed in the middle of the sides of the head. Thorax broader anteriorly than in *T. scabrum*, the sides vertical, margined above; pro-mesonotal suture obsolete, but in all specimens I have seen the pronotum is crossed by a distinct fine transverse carina; meso-metanotal suture moderately distinct above the thorax, incised at the sides at the suture; basal portion of metanotum narrow, short, the posterior lateral angles furnished with moderately long, stout, oblique spines which are divergent and curved outwards at the apex. Pedicel rather short, with large nodes; the 1st node anteriorly petiolate, its face somewhat curved inwards, posteriorly roundly sloped; 2nd node seen from above transversely globose, a little broader than

long and much broader than the 1st node ; abdomen convex, oval anteriorly, slightly truncate.

Length, ☿ 3–3·3 mm.

Hab. Western India, Bombay, Kanara (*Aitken*).

215. **Tetramorium scabrum**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1879), p. 672.

☿. Fuscous brown or black, with a reddish-chestnut tint in certain lights on the head and thorax ; mandibles, antennæ and legs reddish brown, slightly fuscous at times ; head, thorax and nodes of the pedicel above somewhat coarsely reticulate, in certain lights longitudinally striate with reticulations between the striæ ; abdomen smooth, polished, shining, with short longitudinal striæ at the extreme base above ; pilosity pale yellow, long and abundant, very short and oblique on the scape of the antennæ and the tibiæ of the legs. Head without the mandibles rectangular, very slightly longer than broad ; mandibles smooth, not striate, the masticatory margin with one or two large teeth at apex, denticulate inwardly ; clypeus broad, convex, with three parallel vertical carinæ down the middle ; antennal carinæ wide apart, prolonged divergently backwards almost to the top of the head, bordering the well-marked antennal groove, which within is sculptured like the rest of the head ; antennæ short, the scape falling short of the top of the head by about one-fourth its own length. Thorax as in *T. christiei*, but the meso-metanotal suture more clearly marked above, deeply indented and wide on the sides of the thorax ; metanotal spines much stouter and longer, pointing obliquely back, divergent and with a slight curve upwards and outwards towards the apex. Pedicel : the 1st node longer than broad, rounded, with a short petiole anteriorly, abruptly and sharply truncate posteriorly ; 2nd node smaller than the 1st, rounded ; abdomen oval.

Length, ☿ 3–3·5 mm.

Hab. Sikhim (*Möller*) ; Ceylon (*Green*) ; Burma (*Fea & Bingham*) ; extending to Borneo. Mr. Green was good enough to send me several individuals with a note to the effect that they were found in the hollow of a node of *Humboldtia laurifolia*. The Indian and Ceylon specimens have been separated as var. *subscabrum*, Emery, differing from the Bornean type in being smaller with somewhat eebler sculpture.

216. **Tetramorium simillimum**, *Smith* (Myrmica), *List Brit. Anim. Brit. Mus.* pt. 6, *Acul.* 1851, p. 118, ☿.

☿. Head, thorax and pedicel reddish yellow, abdomen clear light brown ; head, thorax and nodes of the pedicel delicately, longitudinally striate, the striæ fine and regular without reticulations between ; abdomen smooth, polished and shining, with a few short light longitudinal striæ at the extreme base ; pilosity somewhat sparse and short. Head rather long and massive, a little broader posteriorly than in front, the sides convex ; mandibles proportionately

large, punctured, the masticatory margin dark brown, acute at apex and denticulate; clypeus convex, broad, indistinctly tricarinate, anteriorly somewhat truncate, its posterior margin in the middle between the bases of the antennæ well-marked; antennal carinæ wide apart, produced backwards as slightly divergent striæ, bordering a shallow but broad hollow for the reception of the scape of the antennæ; antennæ somewhat long and stout, the scape extending to the top of the head; eyes proportionately large, placed on the sides, a little lower than the middle of the head. Thorax in miniature resembling that of *T. smithi*, Mayr, margined in the same way on each side and with the same waved lateral outline; metanotal spines, however, very small, dentate, scarcely longer than the metasternal teeth. Pedicel: the 1st node petiolate anteriorly, higher than the 2nd node and broader than long; 2nd node also transverse, rounded at the sides; abdomen oval, convex.

Length, ☿ barely over 2 mm.

Hab. Indo-Malayan and Ethiopian regions. Recorded within our limits from Calcutta (*Rothney*, *teste Forel*).

The above description is taken from a specimen, labelled by Mr. F. Smith himself, in the Brit. Mus. I have not seen a typical specimen from any part of India. In addition Dr. Forel (Rev. Suisse Zool. x (1902), p. 235) describes two slightly differing races. Race *lævinode*, Forel, seems to differ chiefly in the heavier coarser sculpture of the head and thorax, the broader more margined pro-, meso- and metanotum, and in both nodes being smooth and shining, not sculptured; from Calcutta (*Rothney*). Race *denticulatum*, Forel, according to the description, seems to resemble the insect that I take to be typical *simillimum* in having the metanotal and metasternal spines small and subequal, but it is smaller, with the nodes of the pedicel smaller and a little more sculptured, the sculpture of the head and thorax feebler, and the antennal furrows not well defined.

In Mr. Wroughton's collection there seems to me to be a third race from Bombay, having the head and thorax dark red, the abdomen black. This race is stouter, more heavily made than typical *simillimum*, with the head longitudinally striate, the thorax punctured and reticulate, and the metanotal and metasternal spines or teeth very small and subequal.

Length, ☿ 2·5 to nearly 3 mm.

217. **Tetramorium pilosum**, *Emery*.

Tetramorium (Xiphomyrmex) pilosum, *Emery, Ann. Soc. Ent. Fr.* lxii (1893), p. 247, ☿.

"☿. Ferruginous; mandibles, antennæ and legs testaceous, shining; pilosity long, the hairs fine; the head in the middle deeply striate-rugose, on the sides and posteriorly coarsely reticulate; antennal grooves produced; clypeus carinate, rugulose; mandibles with 7 teeth, at the base smooth, at apex striate; thorax with large coarse reticulations, not impressed on the back, the sutures obsolete; meso- and metanotum obtusely margined, the latter furnished with

a long spine on each side, strong, acute, suberect; the 1st joint of the pedicel petiolate, posteriorly formed into a globose node, rugose, reticulate; 2nd joint transverse, ovate, longitudinally rugose; abdomen very short, with a few piligerous punctures; scape and tibiæ with long pubescence." (*Emery.*)

Length, ☿ 3·5 mm.

Hab. Ceylon, Kandy (*Simon*).

218. **Tetramorium yerburyi**, *Forel.*

Tetramorium (Xiphomyrmex) pilosum, *Emery, race* yerburyi, *Forel, Rev. Suisse Zool.* x (1902), p. 238.

☿. Head, thorax and pedicel chestnut-red; abdomen brown, the apical margin of the 1st, and basal and apical margins of the succeeding segments pale dull whitish brown, the thorax anteriorly a little yellowish; head coarsely striate, slightly reticulate posteriorly; thorax and nodes of pedicel coarsely rugose, reticulate; abdomen smooth, polished and shining; pilosity pale yellow, rather sparse, except on the scape of the antennæ and tibiæ of the legs, where it is much more abundant and oblique. Head longer

Fig. 68.—*Tetramorium yerburyi*, ☿. *a*. Antenna.

than broad and a little broader posteriorly than in front, the sides strongly convex, the occiput widely emarginate; mandibles broad, denticulate, lightly and finely longitudinally striate; clypeus not very convex, rather flat, the anterior margin in the middle transverse, posterior margin well-defined and arched between the bases of the antennæ; antennal carinæ produced divergently back nearly to the top of the head and bordering the well-marked antennal furrows; antennæ somewhat thick and long, the scape extending a little beyond the top of the head; eyes placed about the middle of the sides of the head. Thorax broad anteriorly and convex, narrowing towards the metanotum, not margined in any way; sutures obsolete; metanotal spines very long, slender, divergent and acute, as long as or longer than half the total length of the thorax. Pedicel elongate; 1st node longer than broad, with a somewhat long petiole anteriorly, the node itself narrower in front than posteriorly; 2nd node globose, also narrowed towards the front; abdomen oval.

Length, ☿ 4–4·5 mm.

Hab. Ceylon (*Yerbury*); Kandy, Peradeniya (*Green*).

219. **Tetramorium tortuosum**, *Roger, Berlin. ent. Zeit.* vii (1863), p. 181.

☿. Chestnut-red, the abdomen brown, paling posteriorly to yellowish brown, mandibles yellowish brown, legs lighter chestnut-red; head and thorax longitudinally striate-reticulate and rugose, the nodes of the pedicel and the abdomen smooth, polished, shining; pilosity fairly abundant and long, the hairs obtuse at apex. Head without the mandibles elongate, trapezoidal, longer than broad and broader posteriorly than in front; mandibles faintly longitudinally striate, the masticatory margin comparatively broad, dentate; clypeus very slightly convex, almost flat, the anterior margin transverse, posterior margin well defined between the bases of the antennæ, arched; antennal carinæ produced posteriorly almost to the top of the head, divergent; no antennal furrow, but the space on which the scape rests with somewhat finer sculpture than on the rest of the head; antennæ comparatively stout and long, the scape extending almost up to the top of the head; eyes large, placed about the middle of the sides of the head. Thorax elongate, broad anteriorly; the pronotum in front arched, the anterior lateral angles fairly well-marked but not prominent; meso- and metanotum narrowing posteriorly, the sutures almost obsolete, the spines on the posterior lateral angles of basal portion of metanotum slender, acute, pointing divergently backwards. Pedicel: the 1st node longer than broad, petiolate anteriorly; the 2nd node transverse, broader than long; abdomen oval.

Length, ☿ 3–3·5 mm.

Hab. Recorded so far only from Ceylon, and var. *belli*, Forel, from Western India, Kanara (*Bell*).

The latter differs from the Ceylon specimens in having well-marked antennal furrows, and the nodes of the pedicel rugose on the sides.

220. **Tetramorium smithi**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1879), p. 673, ☿.

☿. Head, thorax and pedicel ferruginous, the latter two a little brighter in colour than the head, abdomen brown, antennæ and legs brighter and paler than the thorax; head and thorax longitudinally striate and rugose, with some reticulations between the striæ; nodes of the pedicel above and the abdomen smooth and shining; pilosity pale yellow, very sparse, oblique on the scape of the antennæ and tibiæ of the legs. Head, without the mandibles, longer than broad, broader posteriorly than in front, the cheeks very convex; mandibles rather large, smooth, shining, not striate; clypeus convex, vertically obscurely tricarinate, its anterior margin transverse; antennal carinæ long, produced back, slightly divergent, antennal furrows well-marked; antennæ short, the scape not nearly extending to the top of the head; eyes large, round, placed about the middle of the sides of the head. Thorax broad, anteriorly as broad as the head, somewhat flat, obscurely margined at the

sides, the outlines of which seen from above are waved; sutures obsolete; metanotal spines short, sub-triangular, acute, pointing obliquely back. Pedicel elongate; 1st node broader than long, in some specimens as broad as long, an elongate petiole anteriorly; 2nd node transverse, broader in front than posteriorly; abdomen oval.

Length, ☿ 2·5 mm.

Hab. Bengal, Western and Southern India. Not recorded from Ceylon, Assam, or Burma.

221. **Tetramorium belgaense**, *Forel.*

Tetramorium (Xiphomyrmex) belgaense, *Forel, Rev. Suisse Zool.* x (1902), p. 238, ♀.

♀. Head, thorax and pedicel chestnut-red, abdomen black, mandibles, antennæ and legs reddish yellow; head, thorax and pedicel coarsely longitudinally striate, reticulate and rugose, subopaque, but the striæ shining in certain lights; abdomen smooth, shining and polished; pilosity abundant, obtuse, reddish on the head and thorax, black on the 1st abdominal segment above and yellowish on the apical segments of the abdomen. Head a little longer than broad, transverse posteriorly, the sides above the eyes somewhat straight, below the eyes slightly convex; mandibles broad, triangular; clypeus convex in the middle, posteriorly broadly rounded, anteriorly only slightly advanced, the margin bent inwards; antennal carinæ wide apart; antennal grooves placed above the eyes, diverging posteriorly; antennæ short, the scape not reaching the top of the head; eyes large, placed about the middle of the sides of the head. Thorax short and somewhat broad; the pronotum vertical, forming no part of the dorsum; the mesonotum and scutellum broad, slightly convex; the metanotum with the basal portion very short, sloping posteriorly, the apical portion concave, smooth and polished, metanotal spines tolerably long, stout and acute. Pedicel short; the 1st node cubical, petiolate in front, 2nd node transversely oval; abdomen broader in front than posteriorly, convex above.

Length, ♀ nearly 4 mm.

Hab. Western India, Belgaum (*Wroughton*).

Genus **ATOPOMYRMEX.**

Atopomyrmex, *Er. André, Rev. d'Ent.* viii (1889), p. 226.

Type, *A. mocquerysi*, André, from Africa.

Range. Ethiopian and Indo-Malayan regions.

☿. Head nearly square, very slightly constricted anteriorly, the sides lightly arched and the posterior lateral angles rounded; mandibles robust, rather narrow, with the masticatory margin short and obtusely dentate; clypeus large, triangular, flat on the disc and anteriorly slightly sinuate in the middle; antennal carinæ short, not prominent; frontal area triangular, distinct, as is also

the frontal groove; eyes moderately large, situated a little behind the middle of the sides of the head; no ocelli; antennæ 12-jointed, scape stout, not reaching the top of the head, club of flagellum formed of the apical three joints and a little shorter than the rest of the flagellum, apical joint nearly equal in length to the preceding two united. Thorax: the pronotum anteriorly produced into a collar or neck, behind which it is abruptly enlarged and raised, margined anteriorly, with the lateral angles prominent; above it is flat, strongly constricted posteriorly and obtusely margined at the sides; the mesonotum narrower than pronotum, with a semicircular depression between the two, and laterally in front with two obtuse prominent tubercles; meso-metanotal suture very distinct, the thorax constricted at that point; the metanotum also has two large lateral tubercles placed opposite to those on the mesonotum; behind the tubercles the metanotum is obliquely sloped and armed posteriorly with a long acute divergent spine on each side, the spines directed backwards and a little arched at their base; legs stout, destitute of all tibial calcaria. Pedicel: the 1st node flat above, seen from the side cuneiform, seen from above a little longer than broad, semicircularly or angularly enlarged on the sides, posteriorly terminating in two stout divergent teeth on the same level as top of node, and pointing backwards; 2nd node transverse, rounded above, slightly dilated at its anterior angles. Abdomen oval, truncate at base, the 1st segment covering three-fourths of its whole length. (*After André.*)

222. **Atopomyrmex ceylonicus**, *Emery, Deutsch. ent. Zeit.* (1901), p. 114, ♀.

♀. Reddish yellow, the mandibles deeper in colour, the abdomen with a broad deep brown transverse band ill-defined at the

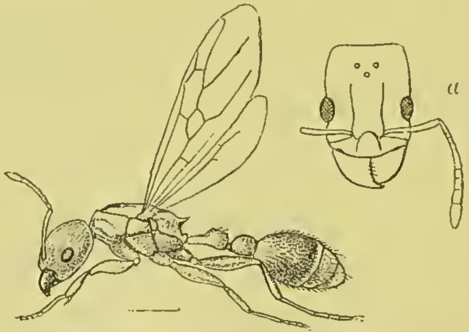

Fig. 69.—*Atopomyrmex ceylonicus*, ♀. *a*. Head from front.

margins, the legs yellow, the articulations ferruginous, the masticatory margins of the mandibles dark brown; head, thorax, except the pronotum and apical face of metanotum, nodes of the pedicel above and extreme base of the abdomen regularly but

somewhat superficially longitudinally striate; the pronotum transversely striate in front, longitudinally on the sides; the apical portion of the metanotum and the whole of the abdomen except the base smooth, polished and shining; pilosity pale, moderately abundant, very short and obtuse, entirely absent on the antennæ and legs, which have only a thin, fine, pale pubescence, visible only in certain lights. Head rectangular, posteriorly transverse and as broad as in front; mandibles triangular, striate, the masticatory margin dentate; clypeus convex in the middle, anteriorly rounded; antennal carinæ elongate, reaching up to the level of the eyes; antennæ short and thick, the scape not extending to the top of the head, the club of the flagellum tolerably distinct, formed of the apical three joints; no antennal groove, but the front of the head slightly concave or flat, where the antennæ rest when folded; eyes round, placed on the sides of the head below the middle; ocelli distinct, a slight short broad groove on the front beneath the anterior ocellus. Thorax elongate, narrow, narrower than the head, the pronotum rounded in front, forming a very little part of the dorsum; mesonotum slightly convex, crossed posteriorly by a transverse carina; metathorax cubical, its disc above, level, with a strong triangular short spine at the posterior lateral angles, the spines parallel and pointing backwards, from the base of these spines two parallel carinæ margin the apical face laterally and end in a broad laminate tooth on each side below; legs moderately long and stout, the tibiæ destitute of calcaria, claws simple. Pedicel elongate; 1st node cubical, longer than broad, convex above, petiolate anteriorly, without spines or teeth; 2nd node quadrate, convex above, slightly broader than long; abdomen oval. Wings hyaline, nervures brownish yellow; fore wing with one cubital and one discoidal cell.

Length, ♀ 8–10 mm.

Hab. Calcutta (*Brit. Mus. & Rothney*); Ceylon (*Horn*); Upper Burma, Ruby Mines (*Bingham*).

In all three cases these were females. The ☿ is unknown.

Genus ACANTHOMYRMEX.

Pheidole, pt., *Smith, Jour. Linn. Soc.* v (1861), p. 111, pl. i, figs. 3 & 4, ☿ ♃.

Acanthomyrmex, *Emery, Ann. Soc. Ent. Fr.* xlii (1893), p. 244, ♃ ☿, pl. 6, figs. 5–10, ♃ ☿.

Type, *A. luciolæ*, Emery, from Ceylon.

Range. Indo-Malayan region.

☿. Mandibles triangular, very broad at the masticatory margin, this margin and the outer margin subequal, the former denticulate; clypeus convex, produced upwards between the base of the antennæ; antennal carinæ short but produced backwards as low, not prominent carinæ, bordering the antennal hollow, which reaches a little beyond the level of the eyes, but is not close to the latter;

antennæ 12-jointed, the club of the flagellum formed of the apical 3 joints as in *Pheidole*. Thorax short, robust, diminishing in width posteriorly, the pronotum armed anteriorly with two long acute divergent spines; pro-mesonotal suture obsolete, meso-metanotal suture tolerably distinct; basal portion of metanotum level, rather short, the posterior lateral angles armed with two long divergent spines; legs rather short, the femora and tibiæ incrassate in the middle. Pedicel: the 1st node squamiform, strongly bidentate above, the 2nd rounded, broader than long, its upper margin transverse but not acute; abdomen almost circular, somewhat depressed and not very convex above.

♃. Head enormously large, articulated on the underside with the thorax, so that the posterior portion of the head projects over the thorax; clypeus curved in the middle anteriorly, otherwise as in the ☿; mandibles very convex on the outside, the masticatory margin above with a sharp cutting-edge, below dentate; antennal carinæ strongly divergent, thick and bordering the antennal hollow, which is as long as the scape and bent downwards towards the eye to receive a portion of the flagellum. Antennæ very short, shorter than in the ☿. Thorax short, without sutures, pronotum not armed, metanotum armed with 2 long erect spines. Pedicel and abdomen as in the ☿, the 1st node much less strongly bidentate.

223. **Acanthomyrmex luciolæ**, *Emery, Ann. Soc. Ent. Fr.* lxii (1893), p. 245.

" ☿. Ferruginous testaceous, mandibles, antennæ and legs lighter, the margins of the mandibles and clypeus blackish shining, pilose but not pubescent. Head subquadrate, the sides convex, posteriorly widely emarginate, studded with piligerous foveæ, thickly punctured, the punctures distinct: the antennal grooves transversely rugose; clypeus shining, anteriorly a little rugose, with two fine carinæ; mandibles somewhat smooth, lightly punctured, the scape

Fig. 70.—*Acanthomyrmex luciolæ*, ☿. (After Emery.)

of the antennæ minutely striate. Thorax with a slight impression at the meso-metanotal suture, the piligerous foveæ confluent; pronotal spines long, a little curved and widely divergent: the metanotal spines elongate, with their bases close together, divergent and bent like cow's horns; from their bases descend two carinæ, limiting the shining area, and produced down to the insertion of the pedicel; the metapleuræ carry posteriorly obtuse

teeth. The 1st joint of the pedicel is posteriorly formed into a squamiform node above with a long petiole in front, the node angular, incised and acutely bidentate; the 2nd joint subglobose and rugose; abdomen highly polished. Femora and tibiæ incrassate, these and the scape of the antennæ pilose.

"♃. Colour of the ☿. Head subparallel at the sides, posteriorly bilobed, the groove on the vertex deep; the piligerous foveolate punctures on the front confluent, more scattered on the lateral lobes, finely aciculate in the intervals, beneath posterior to the articulation with the thorax, that is to say behind the occipital foramen, it is transversely rugose; cheeks longitudinally sulcate, antennal grooves with scattered rugosities; mandibles shining, sparsely punctured and very finely rugulose; clypeus somewhat smooth, not carinate. Thorax with sculpture as in the ☿, no pronotal spines; metanotal spines somewhat straight but divergent, the area between the posterior carinæ smooth and broad. The 1st node of the pedicel more widely emarginate, less acutely bidentate than in the ☿; the 2nd node coarsely rugose and reticulate." (*Emery.*)

Length, ☿ about 3·5; ♃ 4 mm.

Hab. Recorded so far only from Ceylon.

Genus **PRISTOMYRMEX.**

Myrmica, pt., *Smith, Cat.* vi (1858), p. 126.
Pristomyrmex, *Mayr, Verh. zool.-bot. Ges. Wien*, xvi (1866), p. 903.

Type, *P. pungens*, Mayr, from Malacca.

Range. Indo-Malayan region.

☿. Head more or less rounded, very convex in front; mandibles not particularly broad at apex, the masticatory margin bidentate at apex, crenulate above the two teeth; clypeus extending back between the base of the antennæ, the basal portion porrect, obscurely crenulate anteriorly, with a median and two lateral, posteriorly converging, small carinæ; antennæ 11-jointed, scape elongate, curved before the apex; club of the flagellum formed of the apical three joints which together are about equal to or a little longer than the basal seven joints of the flagellum; antennal carinæ long, widely divergent posteriorly; antennal hollow large; frontal area and ocelli absent; eyes rounded, rather small, placed midway on the sides of the head. Thorax broad and flat anteriorly, strongly constricted posteriorly, the pronotum with lateral spines on the anterior angles, pro-mesonotal suture obsolete, the meso-metanotal suture marked by a transverse carina; basal portion of metanotum very narrow and compressed, its posterior lateral angles furnished with a short erect acute spine, from which a vertical carina runs down bordering each side of the apical face of the metanotum, which between the two carinæ is concave; legs comparatively stout and long. Pedicel: the 1st node shortly petiolate in front, its anterior face slightly concave, above a little longer than broad,

slightly convex, posteriorly truncate; 2nd node from above quadrate, about as broad as long, not petiolate; abdomen very convex above, broadly oval, slightly truncate anteriorly.

So far only one species has been recorded from within our limits.

224. **Pristomyrmex brevispinosus**, *Emery, Ann. Mus. Civ. Gen.* xxv (1887), p. 451; *id. loc. cit.* xxvii (1889), p. 500; *id. loc. cit.* xxxiv (1894), p. 464.

☿. Head and thorax yellowish brown; antennæ, legs, pedicel and abdomen pale yellow. Pilosity sparse, entirely wanting on the abdomen. Head and thorax coarsely cribrately punctured, the

Fig. 71. *Pristomyrmex brevispinosus*, ☿.

punctures sometimes confluent; antennæ, legs, pedicel and abdomen smooth, polished, shining. Head orbicular, constricted posteriorly; the sculpture on the thorax sometimes confluent. For the rest the characters of the genus.

Length, ☿ 3·5–4·75 mm.

Hab. The Burma hills above 4000 feet (*Fea*), extending to Sumatra.

Professor Emery has separated the Karennee form as a subspecies, *P. brevispinosus* subsp. *sulcatus*. It is slightly larger than the typical species, has the spines on the pronotum slightly longer, and the punctures on the head and thorax running into sulcations.

Genus LOPHOMYRMEX.

Ocodoma, pt., *Jerdon, Madr. Jour. L. S.* xvii (1851), p. 111, ☿.
Pheidole, pt., *Smith, Cat.* vi (1858), p. 174.
Lophomyrmex, *Emery, Ann. Mus. Civ. Gen.* xxii (1892), p. 114.

Type, *L. quadrispinosus*, Jerdon, from Malabar.

Range. Indo-Malyan region.

☿. Resembles *Phidole* in general appearance, but differs in the shape of the thorax; seen from the front the pronotum rises high above the head, being flat anteriorly and on the top; the anterior lateral angles are, in the typical species, furnished with divergent horizontal short spines or teeth; the pro-mesonotal suture lying immediately behind the flattened top of the pronotum is almost

obsolete, the mesonotum slopes steeply down to a medial transverse carina, behind which the short remaining portion of the mesonotum is level and very distinctly margined posteriorly; meso-metanotal suture broad, deeply impressed; basal portion of metanotum broadening posteriorly and armed at the posterior lateral angles with two long spines; legs stout and long. Pedicel comparatively long, the 1st node squamiform, rather thick and transverse above, petiolate anteriorly; 2nd node broader than the 1st, more or less rounded above; abdomen oval.

Besides the remarkable form of the thorax, the species of this genus differ from *Phidole* in the ☿ not being dimorphous and having only 11-jointed antennæ. Three species are known from within our limits.

Key to the Species.

a. Pronotum armed with two spines or teeth.
  a'. Nodes of the pedicel sculptured ...... *L. quadrispinosus*, p. 195.
  b'. Nodes of the pedicel smooth.......... *L. burmanus*, p. 196.
b. Pronotum unarmed .... *L. bedoti*, p. 196.

225. **Lophomyrmex quadrispinosus**, *Jerdon* (Ocodoma), *Madr. Jour. L. S.* xvii (1851), p. 111, ☿; *Emery, Ann. Mus. Civ. Gen.* xxxii (1892), p. 114.

☿. Head and abdomen chestnut or reddish brown, thorax, legs and pedicel brownish yellow. In some specimens the thorax darkens to brownish and the head and abdomen are brownish yellow; the mandibles, antennæ and legs are always a shade lighter than the thorax; head smooth and shining, the thorax anteriorly smooth and shining, very sparsely punctured and bearing a few piligerous tubercles, posteriorly very finely rugulose, sub-opaque. Pedicel: the nodes rugulose, opaque; abdomen smooth

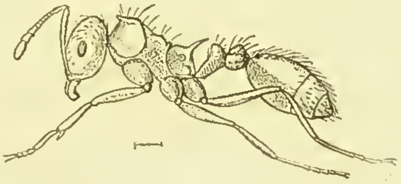

Fig. 72.—*Lophomyrmex quadrispinosus*, ☿.

and shining; pilosity sparse, yellowish in colour, slightly oblique and most plentiful on the abdomen; the scape of the antennæ, and the tibiæ and tarsi of the legs with a short, somewhat dense pubescence. Head a little longer than broad, with a broad posterior margin somewhat broader than in front; mandibles striate at base, slightly convex, the masticatory margin dentate; clypeus smooth and convex; frontal area distinct, depressed, with a short

fine vertically impressed line above it; antennal carinæ rather wide apart, short but prominent; antennæ of moderate length, the scape very nearly extending to the top of the head; eyes lateral, rather small, placed about the middle of the head. Thorax with the characters of the genus, a slight transverse carina between the pronotal spines, the latter triangular, dentate; mesonotum with a prominent transverse carina about the middle, generally bidentate; basal portion of metanotum short, widening posteriorly, the metanotal spines long, acute and slightly curved. Pedicel rather long, the nodes punctured and opaque, transverse; the 2nd node broader than the 1st, this latter with a moderately long petiole in front and a shorter one posteriorly, the upper margin straight with distinct lateral angles; the 2nd node rounded above; abdomen broadly oval.

Length, ☿ 3–3·5 mm.

Hab. N.W. Provinces, Dehra Dun (*Rogers*); Sikhim (*Möller*); Orissa (*Taylor*); Calcutta (*Rothney*); Malabar (*Jerdon*); Kanara (*Aitken*).

226. **Lophomyrmex burmanus**, *Emery, Rev. Suisse Zool.* i (1893), p. 192; *id. Ann. Mus. Civ. Gen.* xxxiv (1894), p. 466, ☿.

☿. Greatly resembles *L. quadrispinosus*, Jerd., but constantly differs as follows:—Smaller, the head proportionately narrower; the pronotal and metanotal spines, especially the former, more robust and longer; the metanotum has in the middle two obtuse low tubercles, instead of the very distinct bidentate carina as in *L. quadrispinosus*; the nodes of the pedicel are smooth and shining, not punctured and opaque. In the typical specimens from Karennee the colour is a pale dull yellow, but specimens I have from both Upper and Lower Burma are more or less shining chestnut-brown, with the thoracic spines and the form of the mesonotum characteristic of *L. burmanus*.

Length, ☿ 2·5–2·75 mm.

Hab. Burma (*Bingham*); Tenasserim, Karennee (*Fea*).

227. **Lophomyrmex bedoti**, *Emery, Rev. Suisse Zool.* i (1893), p. 19. pl. viii, fig. 17.

☿. Adult light yellowish with a tinge of brown to a fairly dark yellowish brown, the legs paler. In some specimens the abdomen and legs are much paler than the head and thorax; for the most part smooth and shining with a few indistinct punctures, the metanotum finely and closely punctured and rugulose; pilosity pale and very sparse. Head longer than broad, slightly convex, much broader posteriorly than in front, the sides convex, the posterior margin distinct; mandibles broad, finely rugulose; clypeus convex, its anterior margin slightly bent inwards; antennal carinæ short, wide apart; antennæ long and somewhat massive, the scape extending to the top of the head; eyes comparatively large,

situated about the middle of the sides of the head. Thorax of the shape characteristic of the genus, but the pronotum unarmed and the metanotal spines more erect than in the other two species and very long, slender and acute. Pedicel: the 1st node rather thick, as broad as long, with a long and rather slender petiole in front; 2nd node rounded above, broader than the 1st node; abdomen oval, slightly truncate anteriorly.

Length, ☿ 2–2·5 mm.

Hab. Sumatra. Sikhim, 4000 feet (*Möller*): Upper Burma, Maymyo, 3000 feet (*Bingham*).

Genus MYRMECINA.

Myrmecina, *Curtis, Brit. Ent.* iv (1829), p. 226, ♂.

Type, *M. latreilli*, Curtis, from South of England.

Range. Palæarctic and Indo-Malayan regions.

☿. Head somewhat square, widely emarginate posteriorly, the lateral angles not prominent; mandibles flat, triangular, indistinctly dentate, maxillary palpi 4-, labial palpi 3-jointed; clypeus bicarinate and bidentate (only bicarinate not bidentate in the Indian species); antennæ 11-jointed, the club of the flagellum consisting of the apical three joints. Thorax short, broad anteriorly, narrowed posteriorly, sutures obsolete; metanotum with the lateral angles of the very short basal portion furnished with a strong spine pointing backwards; legs short and stout. Pedicel short: the 1st node quadrate without petiole in front; 2nd node a little longer than broad, closely attached to the 1st node in front and to the abdomen posteriorly; abdomen oval, rather acuminate posteriorly.

♀. Closely resembles the ☿; head broader than long, mandibles proportionately larger; thorax and abdomen more massive, metanotal spines thicker, more robust.

♂. Head proportionately much smaller than in the ☿ or ♀, globose; eyes very large; mandibles rather small, triangular when closed, covered somewhat by the large labrum; antennæ 13-jointed, the scape very short, a little longer than the 2nd joint of the flagellum, the 1st joint of the latter about half the length of the 2nd, apical joint the longest; mesonotum divided into three subequal portions by a deep ♈-shaped sulcus; metanotum with the basal portion obliquely sloping, bidentate at the posterior lateral angles, the apical portion vertical. Wings: the fore wing with a large subopaque stigma, one radial and one cubital cell. Pedicel and abdomen much as in the ☿.

Only one species has so far been recorded from within our limits. I have carefully examined the type, a ♂, of *Myrmecina pilicornis*, Smith (Cat. vi (1858) p. 133), and I am convinced it does not belong to this genus; it is possibly a *Tetramorium*, and has the 1st node of the pedicel distinctly petiolate.

228. **Myrmecina striata**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 500, ☿.

☿. Black, the mandibles (excepting the margins narrowly), the antennæ, the legs (except the coxæ), the sides of the abdomen, the apical margin of the 1st and the whole of the remaining abdominal segments, reddish yellow; head, thorax and abdomen covered with a sparse pale pilosity, pubescence absent except on the flagellum of the antennæ; head, thorax above and on the sides, and the nodes of the pedicel above longitudinally channeled; mandibles, middle of the clypeus, legs and abdomen smooth and shining, the last highly polished. Head as broad as long, deeply emarginate posteriorly, the occiput submargined anteriorly, the cheeks very slightly convex, the eyes quite lateral and placed well anterior to the middle of the head; mandibles with the masticatory margin indistinctly dentate, the apical tooth acute; clypeus viewed in

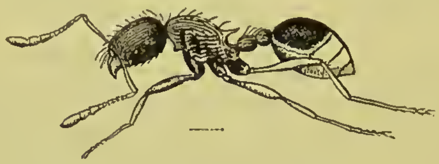

Fig. 73.—*Myrmecina striata*, ☿.

profile somewhat porrect, with a triangular, somewhat depressed medial portion, bearing an indistinct carina on each side, continued as the antennal carinæ, these latter wide apart; antennæ long and stout, the scape very nearly extending to the top of the head. Thorax: the pro-mesonotum a little convex, the sides vertical, slightly concave, the metanotal spines close together, divergent, pointing backwards and slightly upwards; legs with the middle of the femora and tibiæ incrassate. Pedicel and abdomen with the characters as in the genus.

Length, ☿ 3·75 mm.

Hab. Tenasserim, Muleyit, 5000 feet (*Fea*).

Genus LIOMYRMEX.

Myrmica, pt., *Smith, Jour. Linn. Soc.* v (1861), p. 108, ☿.
Liomyrmex, *Mayr, Novara Reise, Formicid.* 1865, p. 23.

Type, *L. cæcus*, Smith, from Dorey.

Range. Indo-Malayan region.

☿. Head rectangular; mandibles more or less triangular, with the masticatory margin dentate; clypeus flat, rounded and distinctly limited posteriorly between the bases of the antennæ, its anterior margin transverse; antennal carinæ remarkably short, somewhat wide apart; antennæ 10–11-jointed, the club of the flagellum long,

formed of the apical three joints, the last joint as long as or longer than the preapical two joints together; frontal area, eyes and ocelli entirely absent. Thorax unarmed, broad in front, narrowed posteriorly, the pro-mesonotal suture wanting; the meso-metanotal suture very distinct, the thorax constricted at that point; legs very robust, the femora and tibiæ incrassate in the middle. Pedicel: the 1st node transverse, broader than long, briefly petiolate in front, beneath armed (in the Indian species) with a spine pointing forwards; 2nd node also transverse, armed beneath with a tooth; abdomen broadly rounded in front, acutely pointed posteriorly.

229. **Liomyrmex aurianus.** *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 504, ☿.

☿. Yellow, smooth, polished and shining all over, the antennæ and legs a shade paler than the head and thorax; the masticatory margin of the mandibles dark brown or black; pilosity and pubescence almost entirely wanting. Head a little longer than broad, the posterior lateral angles rounded, the occipital margin transverse,

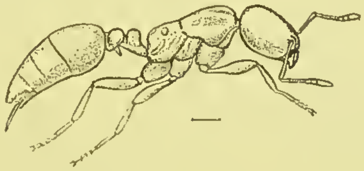

Fig. 74.—*Liomyrmex aurianus*, ☿.

the cheeks very slightly convex, nearly parallel; mandibles somewhat brownish, when closed making the anterior margin of the head transverse. For the rest the characters of the genus.

Length, ☿ 3–3·5 mm.

Hab. Recorded so far only from the hills of Tenasserim (*Fea*).

Genus **MONOMORIUM.**

Formica, pt., *Linn. Syst. Nat.* ed. 10, i, 1758, p. 580.
Monomorium, *Mayr, Verh. zool.-bot. Ges. Wien*, v (1855), p. 452.
Myrmica, pt., *Smith, Cat.* vi (1858), p. 123 (Subdivision 7).

Type, *M. minutum*, Mayr, from Europe.

Range. Both hemispheres.

☿. Head rectangular; mandibles narrow, with three or four acute teeth, maxillary and labial palpi alike 2-jointed; clypeus subtriangular, arched anteriorly, the anterior margin passing somewhat over the closed mandibles, in the middle with two obtuse converging carinæ meeting above between the bases of the antennæ; frontal area distinct, antennal carinæ short, parallel; antennæ

11- or 12-jointed, club of flagellum massive, formed of the apical three joints, about as long as or longer than the remainder of the flagellum; eyes lateral, oval. Thorax somewhat long and narrow,

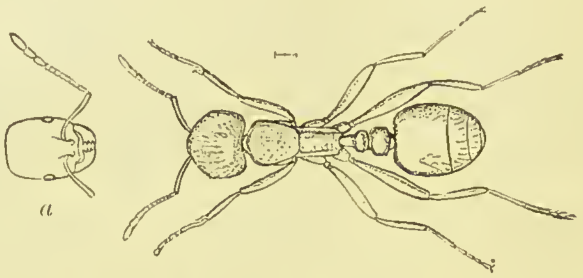

Fig. 75.—*Monomorium latinode*, ☿. *a*. Head.

not much broader in front than posteriorly; pro-mesonotal suture obsolete, meso-metanotal suture deeply marked, metanotum truncate, posteriorly unarmed, the basal portion passing into the apical portion by a rounded curve; legs in the typical species short, in others long and slender. Pedicel: the 1st node shortly petiolate anteriorly, often markedly higher than the 2nd node; abdomen oval, truncate or emarginate anteriorly.

♀. Head and pedicel as in the ☿, the thorax narrow but more massive, the mesonotum long and slightly convex, slightly gibbous in front, overhanging the pronotum; scutellum comparatively large; metanotum roundly curved posteriorly, the sides forming two rounded obtuse ridges with the space between them concave, slightly flat. Abdomen very massive, somewhat cylindrical. Wings: the fore wing with one cubital cell.

♂. In the Indian species the head above the ocelli is remarkably flat and broad, the eyes very large, the mandibles powerful and toothed; the clypeus broad and strongly convex; antennæ filiform, 13-jointed. Thorax and wings much as in the ♀, the metanotum narrower, the mesonotum without any impressed lines. Pedicel much more massive: the nodes larger, the petiole of the 1st node very thick, gradually decreasing in size up to its attachment to the thorax; abdomen more massive, but truncate or emarginate at base as in the ☿.

Key to the Species.

A. Head more or less rugulose, opaque.
  a. Seen from above 2nd node distinctly broader than 1st node.
    a'. Pro-mesonotum distinctly longer than broad.
      a². Yellow, the abdomen posteriorly black.

a^3. Head posteriorly emarginate. Length 1·5–2 mm. .... *M. dichroum*, p. 202.
b^3. Head posteriorly not emarginate. Length 2·5–3 mm. .... *M. pharaonis*, p. 202.
b^2. Head, thorax and abdomen more or less brown.
a^3. Antennæ comparatively long, scape reaching beyond top of head; sides of head very convex ...... *M. 'ongi*, p. 203.
b^3. Antennæ shorter, scape not attaining top of head; sides of head straighter, not so convex.
a^4. Pro-mesonotum very convex, not margined at the sides .... *M. schurri*, p. 203.
b^4. Pro-mesonotum flatter, distinctly finely margined at the sides .. *M. wroughtoni*, p. 204.
b'. Pro-mesonotum short, about as broad as long .... *M. fossulatum*, p. 205.
b. Seen from above 2nd node not broader than 1st; nodes subequal.
a'. Head in front distinctly broader than posteriorly .... *M. indicum*, p. 205.
b'. Head as broad posteriorly as in front.. *M. glyciphilum*, p. 206.

B. Head not rugulose and opaque, but more or less smooth and shining.
a. Head nearly square, almost as broad as long .... *M. aberrans*, p. 207.
b. Head rectangular, distinctly longer than broad.
a'. Antennæ 11-jointed.
a^2. First node of pedicel higher than 2nd node, cuneiform .... *M. orientale*, p. 207.
b^2. First node of pedicel not higher than 2nd node, not cuneiform, globose .. *M. atomus*, p. 208.
b'. Antennæ 12-jointed.
a^2. Scape of antennæ extending beyond top of head.
a^3. Thorax convex above, not submargined .... *M. sagei*, p. 208.
b^3. Thorax somewhat depressed and flat, laterally submargined ...... *M. destructor*, p. 209.
b^2. Scape of antennæ not extending beyond top of head.
a^3. Second node of pedicel not broader than 1st node.
a^4. Head and thorax dark chestnut-brown, abdomen black. Length 1·5–2 mm. .... *M. minutum*, p. 210.
b^4. Head and thorax reddish yellow, abdomen dark brown. Length 2·5-3 mm. .... *M. gracillimum*, p. 210.
b^3. Second node of pedicel broader than 1st node.
a^4. Length 1·5–2 mm. .... *M. floricola*, p. 211.
b^4. Length 3-3·7 mm. .... *M. latinode*, p. 211.

230. **Monomorium dichroum,** *Forel, Rev. Suisse Zool.* x (1902), p. 212.

☿. Remarkably like *M. pharaonis*, Linn., in colour, but is a shorter, more robustly built insect. Reddish yellow, the abdomen black, with the base above a clearer brighter reddish yellow than the colour of the thorax; head, thorax, pedicel and base of abdomen more or less densely minutely rugulose and opaque, the sculpture on the base of the abdomen lighter; pilosity nearly wanting, as in *M. pharaonis*; pubescence very thin and light. Head not so long as in the above species, but broader, the occiput slightly emarginate; mandibles and clypeus similar; antennæ shorter, the scape falling distinctly short of the top of the head; eyes placed a little more anteriorly than in *M. pharaonis.* Thorax somewhat depressed, broad; the meso-metanotal suture only moderately impressed; the metanotum rather short and abruptly truncate. Pedicel: 1st node squamiform, with a long petiole anteriorly; 2nd node globose, broader than long; abdomen oval.

♀. Apparently both winged and ergatoid. The former "of a reddish yellow with some brown marks; abdomen smooth." The latter "entirely brown with 3 ocelli"; the abdomen reticulate, the metanotum grooved but without teeth; the rest resembling the ♀ of *M. schurri.*

Length, ☿ 2–2·5; ♀ 3–4 mm.

Hab. Southern India, the Nilgiri hills (*Daly*).

231. **Monomorium pharaonis,** *Linn.* (Formica), *Syst. Nat.* ed. 10, i (1758), p. 580.
Myrmica domestica, *Shuck. Charlesworth's Mag. N. H.* new ser. ii (1838), p. 626.
Atta minuta, *Jerdon, Madr. Jour. L. S.* xvii (1851), p. 105.

☿. Reddish yellow, the posterior two-thirds of the abdomen black; head, thorax and nodes of the pedicel densely, minutely, rugulose and granulate, shining in certain lights, abdomen smooth and shining; pilosity almost entirely wanting, reduced to a few scattered hairs on the apex of the abdomen, pubescence minute and silky. Head half as long again as broad, the sides slightly convex, the posterior margin transverse; mandibles narrow, linear, slightly broadened at the masticatory margin; clypeus narrow, convex, its anterior margin rounded; antennæ somewhat long and thick, the scape reaching very nearly up to the posterior margin of the head; eyes placed somewhat below the middle of the sides of the head. Thorax: pro-mesonotum convex, rounded in front and at the sides, narrowing posteriorly; meso-metanotal suture very distinct, thorax slightly emarginate at the suture; metanotum seen from above rectangular, somewhat flat, the posterior lateral angles of the basal portion slightly prominent, scarcely tuberculate, the apical portion oblique, about the length of the basal portion. Pedicel: the 1st node cuneiform, but a little thick and rounded at the top, not sharp, anteriorly with a moderately long petiole; 2nd node from above globose, slightly broader than long and broader than the 1st node; abdomen oval, truncate anteriorly.

♀. The only ♀ I have of this species is ergatoid, closely resembling the ☿, but larger and darker, the abdomen also minutely and densely reticulate, rugulose and subopaque. Head, thorax and pedicel dark ferruginous brown; abdomen black, around the base the same colour as the thorax; head from the front very nearly square, the posterior margin straight and transverse, the sides straight, not convex, the posterior lateral angles a little prominent, very nearly forming right angles; mandibles broader than in the ☿, the masticatory margin dentate; clypeus and antennæ as in the ☿. Thorax: the posterior half of the pronotum forming part of the dorsum; the mesonotum long, oval and slightly convex; the metanotum grooved down the middle, concave from side to side, with the sides coming to a moderately sharp edge, the concavity sloping to the apex of the metanotum. Wings entirely wanting. Pedicel long, the 1st node cuneiform but slightly broad and rounded above; 2nd node from above nearly quadrate, broader than the 1st; abdomen massive, elongate, with the sides parallel, anteriorly slightly emarginate.

Length, ☿ 2·5–3; ♀ 4–4·5 mm.

Hab. Throughout our limits, and spread over the tropical regions of both hemispheres.

232. **Monomorium longi**, *Forel, Rev. Suisse Zool.* x (1902), p. 211.

☿. Dull chestnut-brown, the mandibles, antennæ and legs a shade paler; head, thorax and nodes of pedicel finely and densely rugulose, opaque; abdomen smooth and shining; pilosity almost entirely wanting; antennæ and tibiæ of the legs with an oblique short pubescence. Head from the front rectangular with the angles rounded, longer than broad; mandibles opaque, finely sculptured; clypeus raised in the middle, the carinæ nearly obsolete; antennæ long, the scape reaching beyond the top of the head; eyes very small, placed a little in front of the middle on the side of the head. Thorax long, the pro-mesonotum very convex, meso-metanotal suture well marked, the thorax emarginate at the suture; metathorax laterally compressed; the metanotum rectangular, submargined at base, sloping to the meso-metanotal suture. Pedicel: the 1st node squamiform, anteriorly with a long petiole, a little attenuate and rounded at the apex; 2nd node globose, broader than long, seen from above broader than the 1st node; abdomen elongate, oval.

Length, ☿ 2·5 to nearly 3 mm.

Hab. Recorded so far only from Assam (*Long*).

233. **Monomorium schurri**, *Forel, Rev. Suisse Zool.* x (1902), p. 212.

☿. Dark chestnut-brown, almost dark brown, the flagellum of the antennæ (especially at base), the 2nd node of the pedicel, and the articulations of the abdominal segments a sort of dull pale yellow; head, thorax and node of pedicel very finely rugulose, having a dull opaque appearance, abdomen smooth and shining;

in certain lights the head is seen to be minutely longitudinally striate, the pronotum just as minutely but transversely striate; pilosity very sparse, only a few erect hairs on the front of the head and apex of the abdomen; pubescence somewhat dense, but very short and inconspicuous on the scape of the antennæ and tibiæ of the legs. Head longer than broad; mandibles shining, narrow, the masticatory margin armed with 4 teeth; clypeus convex in the middle, slightly shining, the carinæ obtuse; antennæ short, the scape not extending to the top of the head; eyes a little below the middle of the sides of the head. Thorax anteriorly broad, narrowing posteriorly, the anterior margin of the pronotum arched, the anterior lateral angles of the thorax a little pronounced; meso-metanotal suture slight; basal face of metanotum long, narrow, compressed, convex, passing into the apical portion by a rounded curve, and bearing an impression giving the posterior lateral angles of the metanotum an appearance of being subtuberculate. Pedicel: 1st node conical, anteriorly shortly petiolate; 2nd node broader than long and above much broader than the 1st; abdomen elongate, oval.

♀. "Ergatoid. Three small ocelli. Mesonotum a little dilated but without articulations for the wings. Metanotum bidentate. First node of the pedicel squamiform. Abdomen with the appearance of a ♀. The rest as in the ☿." (*Forel.*)

Length, ☿ 2·2–2·5; ♀ 3·7 mm.

Hab. Southern India, the Nilgiri hills (*Wroughton*).

A variety with the head and thorax smoother, not so opaque, I took at Maymyo, 3000 feet, in Upper Burma.

234. **Monomorium wroughtoni**, *Forel, Rev. Suisse Zool.* x (1902), p. 209.

☿. Head, thorax and node of pedicel fuscous or blackish brown, abdomen dark brown; the abdomen except at base smooth and shining, the remainder densely and finely rugulose, opaque; pilosity very sparse, the antennæ and legs entirely without erect or oblique hairs. Head longer than broad, narrow posteriorly, slightly emarginate; mandibles smooth, armed with 4 teeth; clypeus obscurely and obtusely bicarinate, the carinæ slightly projecting anteriorly; antennæ moderately long, the scape nearly reaching the top of the head; eyes lateral, proportionately rather large, very little below the middle of the head. Thorax somewhat depressed, submargined; the pro-mesonotum only very slightly convex, the meso-metanotal suture distinct but not deeply impressed, the thorax barely emarginate at the suture; basal portion of metanotum rectangular, apex truncate. Pedicel: 1st node somewhat conical, rounded above, anteriorly petiolate, the petiole thickening and sloping posteriorly to the node; 2nd node globose, broader than the 1st node; abdomen depressed, somewhat broadly oval, truncate anteriorly, acute posteriorly.

Length, ☿ 2 mm.

Hab. Recorded from Western India, Poona, Kanara (*Wroughton*).

235. **Monomorium fossulatum,** *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 465, ☿ ♀.

☿. Pale dull yellowish brown, antennæ and legs much paler; the head very minutely rugulose, in strong light subopaque, thorax and abdomen shining; pilosity very pale, rather long, sparse and most plentiful on the abdomen. Head rectangular, about twice as long as broad, convex in front, the occiput transverse; mandibles narrow and much arched, the masticatory margin oblique, armed with 4 teeth; clypeus slightly convex, bicarinate, but the anterior margin transverse, the carinæ not projecting; antennæ short, the club thick, formed of the apical 3 joints, the last long and pointed at apex. Thorax: the pronotum and mesonotum together rounded, convex, the meso-metanotal suture deeply impressed; the basal portion of the metanotum longitudinally sulcate, the posterior lateral angles slightly dentate; legs moderately long and stout. Pedicel: the 1st node petiolate in front, viewed in profile subtriangular, the upper margin transverse, rounded, the front slightly curved inwards; 2nd node broader than long, rounded above; abdomen convex, longer than broad anteriorly, slightly emarginate.

♀. Head, thorax, pedicel and abdomen reddish brown; mandibles, antennæ, legs and the articulations of the abdominal segments dull yellowish; pilosity as in the ☿; head in front opaque, finely and very closely punctate-rugose, posteriorly the punctures more distant; thorax more sparsely punctured, shining. Abdomen: the basal segment with large foveolate punctures, posteriorly shining. Head from the front shield-shaped, longer than broad, the occiput truncate or slightly emarginate; mandibles broader than in the ☿, the eyes larger. Thorax: the pronotum vertical, not forming part of the dorsum; the mesonotum long, strongly convex and raised, almost gibbous; the metanotum depressed posteriorly, acute at the lateral angles, but not dentate. Pedicel with the nodes transverse, subequal, the 2nd a trifle broader than the 1st; abdomen elongate, as long as the head and thorax united.

Length, ☿ 1·5; ♀ 2·5 mm.

Hab. Lower Burma, Rangoon (*Fea*).

236. **Monomorium indicum,** *Forel.*

Monomorium salomonis, *Linn., race* indicum, *Forel, Rev. Suisse Zool.* x (1902), p. 213.

☿. Head, thorax and pedicel ferruginous red, the legs and in many specimens the head also verging to brown; abdomen dark brown or black; head, thorax and abdomen rugulose, opaque, the head and thorax anteriorly in certain lights appearing densely and extremely finely longitudinally striate; abdomen minutely reticulate; in some specimens the 2nd and following segments are smooth, polished and shining; pilosity entirely wanting. Head broad, almost as broad as long, broader anteriorly than posteriorly,

the hinder margin slightly concave; mandibles narrow, obscurely longitudinally striate, when closed partially concealed under the projecting margin of the clypeus, the latter obtusely bicarinate: antennæ moderately long, the scape not quite attaining the posterior margin of the head; eyes comparatively large and flat, placed about the middle of the side of the head. Thorax anteriorly rounded, moderately broad, the meso- and metanotum narrow and strongly compressed, the meso-metanotal suture distinct; the thorax in profile emarginate at the suture, the basal portion of the metanotum broadening posteriorly. Pedicel: the nodes, seen from above, nearly equal, the rounded 1st node higher than the 2nd and petiolate anteriorly; abdomen oval.

♀. Closely resembles the ☿, but larger. Head a little broader than long, plainly longitudinally striate. Thorax obscurely transversely striate, the mesonotum narrow, very gibbous anteriorly: metanotum broadening posteriorly, concave apically from side to side, the concavity more coarsely transversely striate. Pedicel: the 1st node anteriorly petiolate, cuneiform, higher, somewhat sharper above than the 2nd node, which is transverse, rounded above; abdomen long and massive, the posterior margins of the segments bright yellow. Colour entirely as in the ☿; pilosity short and somewhat abundant. Wings hyaline, nervures pale yellow.

♂. Dark brown, almost black, the apex of the mandibles, antennæ and tibiæ and tarsi of the legs yellowish ferruginous; entirely rugulose, but silky and shining in certain lights. For the rest the characters of the genus.

Length, ☿ 2·5–3·5; ♀ 7–8; ♂ 6–6·5 mm.

Hab. The Punjab to Madras, and Bombay to Burma. Fairly common. The commonest *Monomorium* in Burma.

237. **Monomorium glyciphilum**, *Smith* (Myrmica), *Cat.* vi (1858), p. 125.

☿. Dull sordid brownish yellow, the apical two-thirds of the abdomen dark brown; head, thorax and node of pedicel minutely rugulose, granulate and subopaque, abdomen shining; pilosity very sparse, reduced to a long soft hair here and there. Head subrectangular with the angles rounded, the sides of the head slightly convex, posteriorly broad, as broad as in front; mandibles smooth and shining, with a few punctures and obscure striæ; clypeus very convex in the middle, the medial posteriorly convergent carinæ not very distinct; antennæ 12-jointed, the scape not quite reaching the top of the head; eyes of moderate size, lateral, placed very little below the middle of the head. Thorax: the pro-mesonotum very convex, rounded anteriorly and at the sides; meso-metanotal suture deeply impressed, the thorax distinctly emarginate at the suture; basal portion of metanotum rounded, convex at the sides, a little flat above, and passing by a

curve into the apical portion. Pedicel rather short, the nodes large, the 1st node cuneiform, slightly conical, higher than the 2nd node; the latter subglobose, slightly broader than long and broader than the 1st node; abdomen oval.

Length, ☿ 2·5–3 mm.

Hab. Ceylon.

Described from Smith's specimens in the British Museum. I have carefully counted the joints of the antennæ in several specimens, and there are 12, not 11 joints as stated by Smith.

238. **Monomorium aberrans,** *Forel, Rev. Suisse Zool.* x (1902), p. 209.

☿. Reddish yellow, the abdomen dark brown with bluish reflections; head, thorax and abdomen smooth and shining, the metanotum above transversely striate, the sides of the thorax posteriorly finely rugulose; pilosity tolerably abundant, oblique on the scape of the antennæ and the tibiæ. Head quadrate, as broad as long, posteriorly emarginate; mandibles finely and closely longitudinally striate and opaque; clypeus somewhat short, subtruncate anteriorly, the two carinæ divergent, not forming teeth anteriorly; antennæ somewhat long and slender, the scape reaching beyond the top of the head; eyes lateral and a little to the front, closer to the anterior than to the posterior margin of the head. Thorax anteriorly very rounded and convex, the promesonotal suture obsolete, the meso-metanotal suture deep and wide, the thorax in profile emarginate at the suture; basal portion of the metanotum slightly convex, rectangular, the posterior lateral angles subdentate, the apical portion of the metanotum obliquely truncate. Pedicel: the 1st node high, conical, rounded and obtuse above, petiolate anteriorly; 2nd node not so high, longer than broad, rounded above; abdomen somewhat elongate, oval.

Length, ☿ 3·5 mm.

Hab. Central Provinces, Pachmarhi (*Schurr*).

239. **Monomorium orientale,** *Mayr, Verh. zool.-bot. Ges. Wien,* xxviii (1878), p. 670, ☿.

☿. Reddish yellow, the mandibles, antennæ and legs slightly paler; smooth and shining; pilosity sparse, the legs with the hairs oblique. Head rectangular, longer than broad, posteriorly transverse, the lateral angles rounded; mandibles narrow, the masticatory margin oblique, armed with 4 teeth; clypeus short, the medial carinæ strongly convergent above; antennæ 11-jointed, rather short, the scape not reaching the top of the head; eyes placed below the middle on the sides of the head. Thorax: the pro-mesonotum comparatively large, convex, the meso-metanotal suture deeply impressed, the thorax constricted at the suture; the basal portion of the metanotum above rectangular, rather flat. Pedicel: the 1st node cuneiform, higher than the 2nd, rounded

above; the 2nd node subglobose, broader than long, broader than the 1st node; abdomen elongate, oval.

Length, ☿ 1·5 mm.

Hab. Recorded from the North-west Himalayas (*Rogers*); Bengal (*Rothney*); the Shan States, Burma (*Bingham*).

240. **Monomorium atomus**, *Forel, Rev. Suisse Zool.* x (1902), p. 210.

☿. Pale yellow, the legs a shade paler than the head and thorax; entirely smooth, polished and shining; pilosity sparse, on the scape of the antennæ and tibiæ of the legs oblique. Head a little broader posteriorly than in front, the posterior border slightly emarginate; mandibles narrow, the masticatory margin with 4 teeth, maxillary palpi 1-jointed; clypeus slightly convex, the carinæ strongly convergent above, obtuse; antennæ 11-jointed, very short, the scape not nearly attaining the posterior margin of the head; eyes placed below the middle of the side of the head. Thorax: the pro-mesonotum very convex, meso-metanotal suture deeply impressed, the thorax constricted at the suture and in profile emarginate above; basal portion of metanotum rectangular, a very little longer than broad. Pedicel: the nodes from above subequal, globose, the 1st node anteriorly petiolate; abdomen oval.

♀. Very narrow. The two nodes of the pedicel thick and rounded. The posterior portion of the pronotum forming part of the dorsum. Mesonotum very narrow and elongate. Of a reddish yellow. A brown mark round the ocelli, and a brownish band on each abdominal segment. For the rest resembles the ☿.

Length, ☿ not quite 1·5; ♀ 2·5 mm.

Hab. Recorded from the North-west Himalayas (*Smythies*): Bengal (*Rothney & Taylor*); Western India, Poona (*Wroughton*); Assam (*Smythies*).

Var. *integrius*, Forel ☿, of which the ♀ is described above, differs from the type in having the meso-metanotal suture less deeply impressed.

241. **Monomorium sagei**, *Forel, Rev. Suisse Zool.* x (1902), p. 211.

☿. Pale yellow, the sides of the abdominal segments indistinctly brownish: some specimens are entirely yellow; head, thorax (metanotum excepted) and abdomen smooth and shining, the metanotum finely rugulose, opaque: pilosity whitish, somewhat sparse, the scape of the antennæ and the tibiæ of the legs pubescent. Head strongly convex in front, the sides straight, the posterior margin widely emarginate and a little broader than the head in front; mandibles narrow; clypeus convex, its anterior margin slightly and widely arched; antennæ long and thick, the scape reaching beyond the top of the head, the club of the

flagellum massive; eyes placed well below the middle of the sides of the head. Thorax somewhat short, the pro-mesonotum gently convex; the thorax seen in profile deeply emarginate at the meso-metanotal suture; the basal portion of the metanotum rectangular, longer than broad. Pedicel: the 1st node squamiform, anteriorly petiolate; 2nd node from above almost circular, smoothly rounded, a little broader in front than posteriorly; abdomen more than twice as long as broad, subtruncate anteriorly.

Length, ☿ 2·2–2·5 mm.

Hab. Recorded from the North-west Himalayas, Dharmsála (*Sage*).

242. **Monomorium destructor**, *Jerd.* (Atta) *Madr. Jour. L. S.* xvii (1851), p. 105, ☿.
Myrmica vastator, *Smith, Jour. Linn. Soc.* ii (1857), p. 71, ☿.
Monomorium basale, *Mayr, Novara Reise, Formicid.* (1865), p. 92.

☿. Head, thorax, pedicel and base of abdomen reddish yellow, apical three-fourths of abdomen from bright chestnut-brown to dark brown, nearly black; entirely smooth and shining, with a few very fine, scattered, shallow punctures, the metanotum delicately rugulose, subopaque; pilosity entirely wanting. Head rectangular, longer than broad, convex in front, posteriorly slightly emarginate; mandibles narrow, broadening slightly towards the masticatory margin, armed with 4 small teeth, the apical longest and acute; clypeus arched anteriorly, the carinæ obtuse; antennæ moderately long, the scape just reaching the top of the head; eyes moderately large, placed on the sides of the head just below the middle. Thorax elongate, anteriorly as broad as the back of the head, the pro-mesonotum convex; meso-metanotal suture deeply impressed, but the emargination of the thorax at the suture slight; basal portion of metanotum narrow, passing by a somewhat rounded curve into the apical portion. Pedicel elongate: the 1st node squamiform, anteriorly petiolate, above with a moderately sharp but rounded margin: 2nd node seen from above globose, but a little broader than long, not so high as the 1st node; abdomen oval.

♀. Resembles the ☿ in colour, but the abdomen has the apical margins of all the segments (the terminal excepted) as well as the basal margins yellow. Head proportionately shorter and rounder than in the ☿, ocelli present. Thorax elongate, the mesonotum very convex: the metanotum long, gently sloped to the apex and rounded. Pedicel as in the ☿, but the 1st node thicker and above rounder; abdomen enormously long and massive, longer than the head and thorax united. Wings hyaline, nervures yellow.

♂. Resembles the ☿ in colour. Head very small, rounded above; eyes and ocelli large and prominent; antennæ filiform, with the scape very short, not longer than the 2nd joint of the flagellum. Thorax short and massive, proportionately deeper than in the ♀, the mesonotum and scutellum very convex and gibbous;

the metanotum long, rounded above and truncate at apex. Pedicel elongate; the nodes from above square, subequal, the 1st node anteriorly petiolate; abdomen not much longer than and similar to that of the ☿. Wings as in the ♀.

Length, ☿ 1·8–2·3; ♀ 8–9; ♂ 4–4·5 mm.

Hab. Throughout our limits, and spread (probably carried and introduced by shipping) through the torrid regions of both hemispheres.

243. **Monomorium minutum**, *Mayr, Verh. zool.-bot. Ges. Wien*, v (1855), p. 453, ☿.

Myrmica (Monomorium) carbonaria, *Smith, Cat.* vi (1858), p. 127.

☿. Head and thorax dark chestnut-brown, abdomen black, sometimes entirely black (Smith's type); very smooth, polished and shining; pilosity pale, very sparse. Head longer than broad, posteriorly transverse; mandibles narrow, with the masticatory margin oblique, armed with 4 teeth; clypeus very convex, anteriorly rounded; antennæ moderately long, the scape very nearly reaching up to the top of the head; eyes comparatively large, placed in the middle of the sides of the head. Thorax: the pro-mesonotum convex, moderately large, the meso-metanotal suture and emargination well-marked; the metanotum compressed, basal portion rectangular, flat, the apical portion truncate, vertical. Pedicel: the nodes from above subequal, the 1st node a little more rounded and petiolate anteriorly; the 2nd node transverse, broader than long, not broader but lower than the 1st node; abdomen oval.

Length, ☿ 1·5–2 mm.

Hab. Recorded within our limits from Travancore (*Rothney*); found also in Southern Europe, Africa, and North America.

The above description is of *M. carbonarium*, which there is no doubt is but a slight variety of the European *M. minutum*, Mayr.

244. **Monomorium gracillimum**, *Smith* (Myrmica), *Jour. Linn. Soc.* vi (1861), p. 34, ☿.

☿. Head and thorax reddish yellow; antennæ, legs and the nodes of the pedicel a paler shade of the same; abdomen dark brown, with a patch of very pale rather sordid yellow at the base; head, thorax and abdomen smooth and shining, with some minute widely-spaced shallow punctures, the metanotum above delicately and rather obscurely transversely striate; pilosity pale, very sparse. Head remarkably convex, a little longer than broad, the posterior lateral angles completely rounded, the occiput between them transverse; mandibles with the masticatory margin very oblique, armed with 4 teeth; clypeus convex in the middle, the anterior margin depressed inwards; antennæ short, slender, the scape falling short of the top of the head by one-fourth of its own length; eyes small, lateral, placed below the middle of the

head. Thorax narrower than the head, emarginate at the meso-metanotal suture; pro-mesonotum convex, narrowed anteriorly and posteriorly; basal portion of metanotum rectangular, slightly convex, apical portion obliquely truncate. Pedicel: the nodes small, the 1st node conical, rounded above, higher than the 2nd and anteriorly petiolate; 2nd node subglobose, not broader than the 1st node, longer than broad; abdomen oval.

Length, ☿ 2·5–3 mm.

Hab. Ceylon, spread through North Africa, Arabia, &c.

Typical *M. gracillimum*, so far as I know, has been recorded within our limits only from Ceylon; but the form separated as var. *mayri* (Forel, Rev. Suisse Zool. x (1902), p. 209) is spread throughout India and Burma. It differs from true *M. gracillimum* in being dark brown with the mandibles, antennæ and legs pale yellow; the basal portion of the metanotum is submargined and is more abruptly truncate at apex, it is densely and very finely transversely striate and opaque.

245. **Monomorium floricola**, *Jerd.* (Atta), *Madr. Jour. L. S.* xvii (1851), p. 107.

Monomorium specularis, *Mayr, Sitzungsb. Akad. Wiss. Wien*, liii 1 *Abth.* (1866), p. 509, ☿.

☿. A variable species as to colour: the head, thorax and legs may be reddish brown, the abdomen dark brown, or the head and abdomen black, the thorax yellow, or specimens may be intermediate between the two. In all cases, however, the mandibles, antennæ and legs are of the same colour as the thorax, only lighter. Entirely smooth, polished and shining; pilosity almost entirely wanting, consisting of a few erect hairs only, on the head anteriorly and on the apex of the abdomen; traces of a very fine short pubescence on the antennæ and on the tibiæ of the legs. Head elongate, rectangular, as broad in front as posteriorly, where the occiput is slightly emarginate; mandibles narrow, armed with 4 teeth; clypeus convex, the carinæ just visible, obtuse; antennæ rather long, the scape just attaining the top of the head, the club of the flagellum remarkably thick and massive; sides of the head straight, not convex; eyes placed below the middle. Thorax proportionately rather long, the pro-mesonotum somewhat pyriform; the meso-metanotal suture very distinct; basal portion of metanotum rectangular. Pedicel: the 1st node anteriorly with rather a thick petiole, the 2nd node rounded, a very little broader than the 1st node; abdomen oval.

Length, ☿ 1·5–2 mm.

Hab. Spread through India and Ceylon; not recorded from Burma.

246. **Monomorium latinode**, *Mayr, Ann. Mus. Civ. Gen.* ii (1872), p. 152, ☿.

☿. Light castaneous brown; mandibles, antennæ and legs

yellowish; head, thorax, nodes of the pedicel and abdomen for the most part smooth, polished and shining; the cheeks below the eyes, the sides of the mesothorax, and the metanotum finely striate, transversely so on the last; pilosity moderate or sparse, fine and rather long, oblique on the antennæ and legs. Head longer than broad, posteriorly transverse; mandibles smooth; clypeus anteriorly arched, the medial carinæ almost obsolete; antennæ moderately long, the scape nearly reaching the top of the head; eyes flat, lateral, placed a little below the middle of the head. Thorax elongate; pro-mesonotum convex, broad, nearly as broad as the head; thorax emarginate at the meso-metanotal suture, the latter deeply impressed; the basal portion of the metanotum long, rectangular, truncate posteriorly. Pedicel long, in profile the 1st node rather thick, convex anteriorly and posteriorly, with a petiole in front, little if at all higher than the 2nd node, which is transverse, very much broader than the 1st node, rounded anteriorly, transverse posteriorly; abdomen long, oval, somewhat truncate at base.

Length, ☿ 3–3·7 mm.

Hab. Spread throughout India, Ceylon, and Burma, extending to Borneo.

Smith described a number of ants from India under the genus *Myrmica*, some of which may belong to the genus *Monomorium*. The descriptions, however, are unfortunately so short, giving chiefly details of colour, that in the absence of the types (and the greater number of these are lost) it is impossible to say whether the insects he described belonged to true *Myrmica*, *Monomorium*, *Leptothorax*, *Tetramorium*, or even *Solenopsis*. Moreover, a great number of Smith's types were females or males, and from his descriptions it is, more often than not, utterly impossible to assign any workers to them. As an instance, Smith's *Myrmica bidentata* (Cat. vi, p. 124), from Calcutta, surmised by Mayr to be a *Monomorium*, is, I have little doubt, a ☿ of *Solenopsis geminata*. At least there is a solitary distorted specimen, without antennæ, that I make out to be this ant, gummed on a card in the collection of the British Museum. This is labelled *Myrmica bidentata*, Smith, but not in Smith's writing. I give below references to Smith's descriptions, also to a few other species described by Jerdon, Walker, and Motschulsky which may belong to *Monomorium* or any one of the genera mentioned above, but which I have been unable to identify.

Atta dissimilis, *Jerdon, Madr. Journ. L. S.* xvii (1851), p. 107.
Atta domicola, *Jerdon, l. c.* p. 105.
Myrmica cæca, *Jerdon, l. c.* p. 116.
Myrmica breviceps, *Smith, Second Yark. Miss., Hymen.* 1878, p. 12, ♀. (No locality.)
Myrmica cursor, *Smith, l. c.* p. 11, ♀. (No locality.)
Myrmica luctuosa, *Smith, l. c.* p. 12, ♂.
Myrmica humilis, *Smith, Cat.* vi (1858), p. 123, ♀.
Myrmica rugifrons, *Smith, l. c.* p. 124, ♀.

Myrmica consternens, *Walker, A. M. N. H.* ser. 3, iv (1859), p. 374.
Myrmica obscurata, *Motsch. Bull. Soc. Nat. Mosc.* xxxvi, 2, 1863, p. 16.
Myrmica pallinodis, *Motsch. l. c.*

Genus VOLLENHOVIA.

Myrmica, pt., *Smith, Journ. Linn. Soc.* vi (1861), p. 46, ♀.
Vollenhovia, *Mayr, Novara Reise, Formicid.* 1865, p. 21, ♀.

Type, *V. punctatostriata*, Mayr, from Java and Borneo.
Range. Indo-Malayan region.

☿. Head somewhat square, transverse or very slightly emarginate posteriorly, the posterior lateral angles not prominent; mandibles triangular, strong, the masticatory margin dentate; clypeus narrow, the medial portion produced back between the bases of the antennæ, bicarinate, with a medial somewhat broad longitudinal groove; frontal area very small, acutely triangular; antennal carinæ short, somewhat wide apart; antennæ 11-jointed,

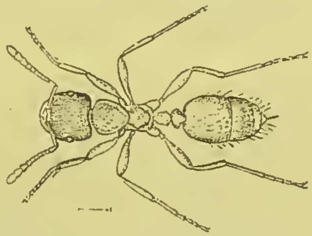

Fig. 76.—*Vollenhovia levithorax*, ☿.

short and thick, the club of the flagellum formed of the apical three joints; eyes moderate. Thorax somewhat depressed and flat above, broad, anteriorly constricted at the meso-metanotal suture, which is well-marked and very distinct; pro-mesonotal suture obsolete; metanotum unarmed, slightly compressed, the basal portion level, passing by a rounded gradual curve into the apical portion. Legs short and robust. Pedicel short, the nodes subglobose, unarmed, large, not or very broadly petiolate anteriorly; abdomen elongate, oval, not broader than the thorax.

♀. Very similar to the ☿. "Anterior wing with an open radial, and a cubital and discoidal cell" (*Mayr*).

247. **Vollenhovia levithorax**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 501, ☿.

☿. Dark brown, shining, the head anteriorly, the antennæ, legs and abdomen lighter brown; pilosity yellowish, sparse; pubescence fairly abundant on the head, antennæ and tarsi. Head square, longitudinally striate and opaque; mandibles,

clypeus medially, and the scape of the antennæ smooth and shining. Thorax, nodes of the pedicel and abdomen smooth, shining, with a very few scattered punctures, most plentiful on the nodes of the pedicel above. For the rest the characters of the genus.

Length, ☿ 3·75–4 mm.

Hab. Tenasserim (*Fea*), extending to the Malayan subregion.

Genus TRICHOMYRMEX.

Trichomyrmex, *Mayr, Novara Reise, Formicid.* 1865, p. 19.

Type, *T. rogeri*, Mayr, from Ceylon.

Range. Known only from Ceylon.

"♀. Mandibles triangular, moderately narrow, dentate; antennæ without a distinct club; frontal area indistinct and remarkably narrow; frontal furrow slight, vertex with a medial fovea; thorax unarmed, metanotum rounded; 1st joint of the pedicel anteriorly triangularly petiolate, posteriorly with a transverse node, 2nd joint globose, unarmed; abdomen a long oval; front wing with one cubital and one discoidal cell, the cubital nervure joined to the transverse nervure at the commencement of the bifurcation, radial cell open; calcaria simple, minute." (*Mayr.*)

248. **Trichomyrmex rogeri**, *Mayr, Novara Reise, Formicid.* 1865, p. 19, footnote.

"♀. Length 11 mm. Brown, head and part of the thorax reddish, abdomen fuscous, flagellum and tarsi testaceous red; with adpressed pilosity, shining, head not densely punctured; mandibles, cheeks and front longitudinally and the vertex transversely striate; clypeus smooth in the middle; thorax partly smooth, partly with scattered punctures, sides of the thorax posteriorly striate, pedicel finely and lightly rugulose; abdomen (almost smooth) finely coriaceous-rugulose, 1st segment smooth; the legs with numerous somewhat erect hairs; wings subhyaline."

Hab. Ceylon (*Mayr*). Unknown to me.

Genus LEPTOTHORAX.

Formica, pt., *Fabr. Syst. Ent.* 1775, p. 393.
Myrmica, pt., *Latr. Hist. Nat. Crust. Ins.* xiii, 1805, p. 259; *Smith, Cat.* vi, 1858, p. 119.
Leptothorax, *Mayr, Verh. zool.-bot. Ges. Wien,* v (1855), p. 431.

Type, *L. acervorum*, Fabr., from Europe.

Range. Both hemispheres.

☿. Head more or less broadly oval (in the Indian species); mandibles moderately broad, masticatory margin with 4 or 5 teeth; clypeus triangular, more or less convex, its anterior margin transverse; frontal area triangular; antennal carinæ short and nearly straight; antennæ short, 12-jointed, the club of the flagellum formed of the apical 3 joints, which united are about as

long as, or longer than the rest of the flagellum; eyes lateral, comparatively large, oval. Thorax long and narrow, the pronotum convex anteriorly and rounded at the sides in front; pro-mesonotal suture obsolete; meso-metanotal suture distinct, in profile the thorax slightly emarginate at the latter suture; metanotum—the basal portion rectangular, generally armed with two spines or teeth at the posterior lateral angles (in some species entirely unarmed) legs moderately long. Pedicel: the nodes rounded, the 1st node shortly petiolate anteriorly; abdomen elongate, oval.

♀. Closely resembles the ☿, very little larger; metanotum generally armed; abdomen a little more massive; fore wings with one cubital and one discoidal cell.

♂. Resembles the ♀, the head smaller, the thorax shorter and a little deeper; mandibles narrow, with the masticatory margin truncate; clypeus arched, convex; antennæ 13-jointed. Thorax: the mesonotum convex, the disc marked with two posteriorly convergent impressed lines. Pedicel as in the ♀; the abdomen smaller, broadly oval.

Key to the Species.

a. Thorax: the metanotum without teeth or spines	*L. inermis*, p. 215.
b. Thorax: the metanotum with either teeth or spines.	
a'. Length over 3·5 mm.; of a pale ochraceous yellow	*L. taylori*, p. 216.
b'. Length under 3·5 mm.; chestnut-brown to dark brown.	
a^2. Thorax sculptured and opaque; metanotal spines distinct.	
a^3. Meso-metanotal suture distinct; metanotal spines comparatively large and acute at apex; colour ferruginous red	*L. rothneyi*, p. 217.
b^3. Meso-metanotal suture nearly obsolete; metanotal spines comparatively small and obtuse at apex; colour blackish brown	*L. schurri*, p. 218.
b^2. Thorax shining, with only a few striæ and irregular rugosities	*L. fultoni*, p. 216.

249. **Leptothorax inermis**, *Forel, Rev. Suisse Zool.* x (1902), p. 229.

☿. Head and thorax dark brown, almost black; mandibles, antennæ, legs and pedicel chestnut-brown, abdomen dark chestnut-brown; head and thorax shining, very slightly longitudinally rugose, taking in certain lights the appearance of being widely striate; the legs, pedicel and abdomen smooth, highly polished and shining; pilosity almost entirely wanting, reduced to a few very scattered hairs; pubescence on the scape of the antennæ and the tibiæ recumbent. Head a little longer than broad and as broad in front as posteriorly, the sides of the head somewhat convex;

mandibles subtriangular, the masticatory margin armed with 5 small teeth; clypeus with the medial portion slightly convex, rounded posteriorly, anterior margin transverse; antennæ rather short, the scape curved near the base, not reaching the top of the head; eyes lateral, situated about the middle of the head. Thorax anteriorly rounded and convex, the basal portion of the metanotum rectangular, rounded above, truncate posteriorly, unarmed, but with half-obsolete lateral tubercles. Pedicel: the 1st node cuneiform, petiolate anteriorly, obtuse, rather transverse above; 2nd node convex above, about as broad as long; abdomen oval, slightly transverse anteriorly.

Length, ☿ 4 mm.

Hab. Recorded from Dharmsála (*Sage*).

250. **Leptothorax taylori**, *Forel, Rev. Suisse Zool.* x (1902), p. 228.

☿. Entirely of a pale ochraceous yellow, the teeth of the mandibles only bright brown, the abdomen slightly shaded with fuscous; head, thorax and pedicel somewhat coarsely reticulate-striate, base of the abdomen finely longitudinally striate; rest of the abdomen and the legs smooth and shining; pilosity sparse, rather setiform, obtuse at apex, short; tibiæ and the antennæ with oblique, almost recumbent pubescence. Head without the mandibles rectangular, very little longer than broad, the occiput transverse; mandibles triangular, smooth and shining, slightly pubescent; clypeus anteriorly transverse, the medial portion slightly convex, posteriorly rounded; antennæ somewhat short, the scape not reaching the top of the head. Thorax rather depressed, only slightly convex above, in profile widely emarginate at the meso-metanotal suture which is very distinct; metanotal spines slender, obtuse at apex, oblique or suberect. Pedicel: the 1st node cubical, anterior face curved inwards, with a long petiole; 2nd node from above subquadrate, the angles rounded; abdomen oval, very convex above.

Length, ☿ 5 mm.

Hab. Recorded so far only from Bengal (*Rothney & Taylor*).

251. **Leptothorax fultoni**, *Forel, Rev. Suisse Zool.* x (1902), p. 229.

☿. Chestnut-brown, the head slightly darker than the thorax, the abdomen dark brown; head, thorax and abdomen shining, head with a few rather widely-parted longitudinal striæ; thorax punctured and a little rugose, more so towards and on the metathorax, pedicel with the nodes subopaque; abdomen highly polished, smooth and shining; pilosity pale, very sparse and scattered. Head widely oval, as broad in front as posteriorly, the sides convex; mandibles slightly shining, minutely punctured and pruinose; clypeus convex, its posterior margin slightly arched; antennæ moderately long, the scape extending to he

top of the head; eyes placed a little below the middle of the sides of the head. Thorax elongate, narrow; seen in profile the pro-mesonotum convex, the metanotum above level, a wide shallow emargination between the two, the meso-metanotal suture distinct, the metanotal spines reduced to two small teeth; legs rather long and slender. Pedicel: the 1st node somewhat cuneiform, sloping gradually in front to almost the base of its short anterior petiole; 2nd node rounded, a little broader than long and broader than the 1st node; abdomen somewhat massive, broadly oval.

Length, ☿ 2·5–3·5 mm.

Hab. Recorded so far only from the North-west Himalayas, Dharmsála (*Fulton*).

252. **Leptothorax rothneyi**, *Forel, Rev. Suisse Zool.* x (1902), p. 230.

☿. Head more or less ferruginous brown, thorax and pedicel more or less bright ferruginous red, abdomen brown to dark brown, mandibles, antennæ and legs yellow; head and thorax minutely and closely punctured, rugulose and more or less opaque, in some specimens slightly shining; pilosity pale, short, sparse,

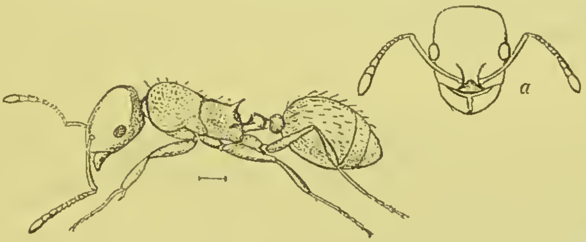

Fig. 77.—*Leptothorax rothneyi*, ☿. *a*. Head from front.

the apices of the hairs blunt. Head broadly oval as in *L. fultoni*, somewhat broader and more transverse posteriorly; mandibles minutely longitudinally striate at base; clypeus very convex in the middle, polished and shining; antennæ much as in *L. fultoni*, the club of the flagellum more massive; eyes rather large, placed in the middle of the sides of the head. Thorax: the pro-mesonotum rather broad, anteriorly convex, narrowing posteriorly; the basal portion of the metanotum rectangular, with a somewhat stout triangular erect spine at the posterior lateral angles on each side. Pedicel thick, the nodes somewhat as in *L. fultoni*, the 2nd node transverse, broad; abdomen oval, anteriorly truncate, posteriorly somewhat pointed.

Length, ☿ 2·5 to nearly 3 mm.

Hab. North-west Himalayas, Mussoorie (*Rothney*); Sikhim (*Möller*); hills of Central India, Pachmarhi (*Schurr*).

253. **Leptothorax schurri**, *Forel.*

Leptothorax rothneyi, *race* schurri, *Forel, Rev. Suisse Zool.* x (1902), p. 231.

☿. Black, the mandibles, antennæ and legs reddish brown. Head longitudinally rugose, punctured, opaque, thorax and pedicel more densely punctured and opaque, abdomen smooth and shining; pilosity pale, tolerably plentiful; antennæ and tibiæ of the legs with short pubescence. Head without the mandibles broadly oval, the sides convex; mandibles triangular, minutely longitudinally striate and pubescent; clypeus convex in the middle, its anterior margin somewhat rounded; antennæ short, the scape extending just to the top of the head, the club of the flagellum very distinct; eyes rather large, situated about the middle on the sides of the head. Thorax level, rounded above, the meso-metanotal suture distinct but not deep or wide; metanotal spines short, stout and erect. Pedicel: the 1st node without any distinct petiole in front, but the joint of the pedicel with a curved slope to the flat apex of the node, which is acute in front; 2nd node subquadrate with the angles rounded, broader than the 1st node but not so high; abdomen broadly oval.

Length, ☿ 2·5 mm.

Hab. Recorded so far only from Pachmarhi, Central India (*Schurr*).

Genus **STEREOMYRMEX.**

Stereomyrmex, *Emery, Deutsch. ent. Zeit.* 1901, p. 115, ☿ ♂.

Type, *S. horni*, Emery, from Ceylon.

Range. So far known only from Ceylon.

☿. Head from the front, without the mandibles, almost square, the front and sides somewhat flat, very slightly convex, the

Fig. 78.—*Stereomyrmex horni*, ☿.

occiput transverse; mandibles subtriangular, the inner and masticatory margins almost at right angles, the latter dentate; clypeus with the middle portion produced between the base of the antennæ and higher than the depressed side portions; frontal area very small, the antennal carinæ very short; antennæ short and thick,

11-jointed, joints 3–8 very short indeed and massed together, 9–11 forming the club, of which the apical joint is longer than the other two ; eyes not large, placed about the middle of the sides of the head. Thorax above without sutures, gently curved and convex, the sides flat, vertical and margined above, pronotal lateral angles prominent ; thorax slightly constricted just in front of the metanotum, the basal portion of which is rectangular, the lateral angles with two slightly divergent horizontal spines. Pedicel : the 1st joint rather thick with the hind portion raised into a transverse scale-like node, rounded above ; 2nd node transverse, broader than long ; abdomen broadly oval.

" ♂. Head rounded. Mandibles triangular, dentate. Clypeus obtusely angled, slightly produced between the antennæ as in the ☿. Antennæ 11-jointed ; scape short, 2nd joint small, 3rd larger than the 2nd or 4th, 7th to 10th globose, the latter portion thereby resembling a rosary of beads. Mesonotum convex, with deep converging grooves. Scutellum and metanotum falling steeply to the sloping epinotum, the latter unarmed, with long basal portion and vertical flat apical portion. First joint of the pedicel broadening posteriorly, seen from above triangular ; second joint oval. The stipes in the genital armature are long, gradually conical, the two together forming a pair of forceps. Front wing with a closed radial and a closed cubital cell, but no discoidal cell." (Neuration of the *Myrmecina*-type.)

254. **Stereomyrmex horni**, *Emery, Deutsch. ent. Zeit.* 1901, p. 116.

☿. Reddish yellow, the flagellum of the antennæ and the legs paler yellow ; head, thorax and pedicel minutely granulate, opaque ; abdomen smooth, slightly shining ; pilosity exceedingly sparse, almost wanting, a few erect hairs on the anterior portion of the face, the legs in part, and on the abdomen posteriorly ; pubescence silvery in certain lights, dense and very short. The rest as in the characters for the genus.

" ♂. Brown, in parts darker. Head black, opaque, rugosely punctured, the rest shining. Legs brighter brown ; the mandibles, the first two joints of the antennæ and the apex of the abdomen brownish yellow. Legs and antennæ with longer pubescence ; head, thorax and abdomen with long oblique brush-like hairs. The form of the epinotum as given in the characters for the genus. Wings greyish, with brown nervures." (*Emery.*)

Length, ☿ 2·5 ; ♂ 3·2 mm.

Hab. Recorded from Ceylon.

I owe two specimens of this rare ant to the kindness of Prof. Emery.

Genus PHIDOLE.

Formica, pt., *Fabr. Ent. Syst.* ii (1793), p. 361.
Atta, pt., *Sykes, Trans. Ent. Soc.* i (1835), p. 103, ☿, pl. 13, fig. 2.
Pheidole, *Westw. A. M. N. H.* vi (1841), p. 87.

Type, *P. providens*, Sykes, from India*.

Range. Both hemispheres.

♃. Head always in appearance somewhat disproportionately large as compared with the body; occiput with a medial, more or less deep emargination dividing the head posteriorly almost into two lobes; mandibles strong, broad, triangular, with or without teeth along the masticatory margin; clypeus narrow, produced medially back between the bases of the antennæ, in a few species produced a little anteriorly also, the anterior border sometimes emarginate in the middle; frontal area small, depressed; antennal carinæ very often as long as the scape, bordering on one side a groove into which the scape and flagellum fold up; antennæ 12-jointed, the club of the flagellum composed of the apical three joints (in two Indian species and some American species of the apical four joints, *Ceratophidole*); eyes of moderate or small size; ocelli absent. Thorax with the pro- and mesonotum raised, more or less convex, the pronotum very often laterally bituberculate, and the mesonotum with a transverse sulcation, the portion behind which is raised into a more or less thickened transverse ridge; meso-metanotal suture distinct; metanotum with a basal portion horizontal or sloping and ending posteriorly in a spine or tooth on each side, and an apical portion vertical or oblique; legs moderately long and stout, claws simple. Pedicel two-jointed with nodes above, the anterior node very often with an appendix beneath; abdomen more or less broadly oval.

☿. Resembles the ♃ in the general shape of the thorax, pedicel and abdomen, but is of course smaller; the pro-mesonotum is never proportionately so high, and the abdomen is comparatively narrow; the head is much smaller, is never deeply emarginate and has the posterior margin very often convex; the antennæ are as a rule proportionately much longer.

♀. Resembles the ♃, but has the head smaller and narrower than the thorax, the ocelli are present, and the occiput only slightly and very widely emarginate. Thorax massive, broad, flat above, the pronotum does not form part of the dorsum, and the metanotal spines are stouter, sometimes triangular. Pedicel and abdomen as in the ♃, but more massive.

♂. Resembles the ♀, but the head is much smaller, about as long as it is broad across the eyes, which are very large and prominent; mandibles smaller, narrower; antennæ 13-jointed, filiform,

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* Neither Sykes's original description nor subsequent descriptions by Westwood or Jerdon are sufficiently detailed to allow of the species named "*providens*" by Sykes to be discriminated from "*indicus*," Mayr, but it probably was "*providens*" that Mayr re-named.

the scape short, the basal joint of the flagellum globose, the apical joints not forming a distinct club; ocelli three, somewhat wide apart and prominent. Thorax massive, short, the mesonotum much raised and gibbous, the metanotum depressed vertically beneath the scutellum, its basal portion level, unarmed, its apical portion truncate. Wings · the fore wing with an open radial, two cubitals and a discoidal cell. Pedicel as in the ♀. Abdomen less massive, the external genital valves cultriform, the apex obliquely truncate.

The ants belonging to this genus are harvesters like the species of *Messor* and *Phidologiton*, but are, as Mr. Wroughton also has noticed and recorded, far behind the species of those genera in the matter of road-making. The species of *Phidole* are not common in Burma, not nearly so common, so far as my experience goes, as *Phidologiton*, *Solenopsis*, or even *Holcomyrmex*. The only species that came at all frequently under my observation was one that I took to be *P. sulcaticeps*, Mayr, but which has since been separated as a distinct race under the name "*yeensis*" by Dr. Forel. Further on I record the few notes I made about this species.

Mr. Wroughton states regarding the intelligence, &c., of *Phidole* that "It has been proved (?) by numberless experiments that though ants can go and fetch associates, they cannot *send* them. These experiments, however, have all been made with European ants (mostly Formicidæ = ? *Camponotinæ*) and in captivity. One has only to frighten with a piece of grass the ☿ about the entrance to a nest of *Phidole*, and to note the rapidity with which one or more ♃ come bustling on to the scene, to have his faith in the result of these experiments somewhat shaken. On one occasion I was trying to attract some *Triglyphothrix* with a piece of bacon (in order to find the nest); a single ☿ of *P. latinoda* appeared on the scene and, having tasted the bait, immediately started off at a run for home, meeting and passing the word to several ☿ on the way. I traced her to the nest a good ten paces off, and then returned at once to my bait. It had been lying for a good quarter of an hour before the first ☿ found it, but immediately after my return to it I became aware of several ☿ making for it, not in a direct line, but quartering the ground like pointers, and steadily advancing all the time in the right direction; nor were these following the return track of ☿ No. 1, but were converging on the bait, each along a line of her own. Very shortly after they had reached the food, two or three ☿ followed by a lumbering ♃ appeared coming from the nest, following very closely though somewhat hesitatingly the return track of No. 1. On seeing them coming I lifted the bait and the few ☿ which had already reached it, and then saw the newcomers arrive and actually overrun the spot where the bait had lain. It seemed to me clear that one or the other batch of ☿ must have been *sent*."

On the path leading from the Forest Inspection bungalow at Maymyo, the little hill-station near Mandalay, were two or three

nests of *Phidole jeensis*—one only a few yards from the portico of the bungalow. One day I placed half a handful of broken rice a little distance from the nest, and sat down to watch. Numerous ☿ ☿ from the nest were about, some laden and some unladen, coming and going in a regular double stream to a patch of coarse grass in seed about 30 feet or so distant; others apparently were wandering around aimlessly, while at the entrances to the nest itself was a busy crowd, clearing husks and debris out of the nest. Mixed up with these last were one or two big-headed ♃ ♃, not helping in the work but coming out apparently for a reconnoitre and retiring in slow pompous fashion. For nearly half an hour my rice-grains lay unheeded. Very often a ☿ would pass very close to the rice, but apparently without discovering it; more than once also I saw an ant run right over the grains without pausing, and retire to the nest. At last two ☿ ☿ chanced on the food simultaneously; both stopped, touched the nearest grains with their antennæ, seemed to lick them a bit, and finally one took up a grain and trotted off towards the nest, while the other remained behind wandering about, touching grain after grain, going away for a bit, and returning, apparently quite unable to make up her mind what to do. Watching the one that had carried off a grain, I noticed that she was stopped more than once on her road to the nest by other ☿ ☿, with whom she seemed to exchange antennal touches; finally she disappeared into the nest. The individuals spoken to seemed to continue their aimless running about, *none making in the direction of the rice.* After an interval of three or four minutes, a party of seven or eight ☿ ☿ started from the nest and made towards the rice. I presumed, though of course I could not be certain, that the ant that discovered the food was with them. On the way the party was joined by one or two more ☿ ☿, presumedly, but again there is no certainty, from among the individuals who had been met with and spoken to by the original discoverer of the food. The ☿ that had with the first-mentioned ant been the codiscoverer of the rice had all this time remained as if on guard near the grain. On the approach of the party she skirmished out towards it with what schoolboys would call a very "cocky" air, threatening the other ants. After having some words, she and another ☿ suddenly laid hold of each other and had a rough-and-tumble. Presently one (which I cannot say) made off in a direction away from the nest. It is noteworthy that the party which came from the nest straggled a good deal, though keeping to the line traversed by those in front; further, that again and again some wandering ☿, seeing (?) or being told (?) of her comrades travelling steadily in one direction, joined the party and helped to carry the food to the nest. Too much caution cannot be exercised in drawing conclusions from insect behaviour, but watching my ants finding and assembling at food, I have been irresistibly reminded of vultures gathering to a carcass. One vulture only perhaps has at first seen it; others seeing him hastening in a particular direction, and

learning from experience that his manner of flight indicates food in sight, have joined him, till a mighty assemblage gets together. So I think it is with ants, but in any interpretation of their actions we are dreadfully hampered by our ignorance of the extent and limit of their senses.

I varied my experiments in many ways, using various baits. Often my experiments were entire failures, no ant coming to the baits for the whole of the time I could spare to watch by them. At other times the course pursued by the ants seemed entirely contradictory to their usual habits. Once when I had baited with sugar, a ☿ from tho nest of *P. yeensis*, mentioned above, fouud the food quickly, but after tasting she picked up a grain and started off in a direction opposite to that in which lay her nest. After walking about a bit, she dropped the grain and wandered away. The sugar lay a yard or so off the nest of *Phidole* untouched by them. Four hours afterwards I found it being cleared off by a swarm of *Tapinoma* and one or two giants of *Diacamma scalpratum*.

I tried at times to mark with white paint the ants that first discovered my baits. As a rule, or rather I may say with only two exceptious, I succeeded only in frightening the discovering ants, so that they never returned or brought comrades to carry off the food. The twice that I was successful, the marked ☿ ☿ of *P. yeensis* returned with the first party sent out of the nest. On one of the two successful occasions, I managed to mark, without alarming them out of their senses, two of three ants that had discovered the bait within half a minute of each other, and it was an interesting sight to see the two race each other, each with a grain of sugar, to the nest, apparently trying to see which of them should be the first to communicate the news of food and possibly get all the kudos for it. Both these marked ants sallied forth with the first party sent from the nest.

Key to the Species, ♃.

A. Club of flagellum of antennæ formed of the apical three joints.
- *a*. First joint of the pedicel with a projection or appendix beneath.
  - *a'*. Metanotal spines clavate and obtuse towards apex like the halteres or poisers of a dipteron .... *P. spathifera*, [p. 232.
  - *b'*. Metanotal spines more or less acute at apex, not clavate.
    - *a*². Head posteriorly smooth and shining, not sculptured............................... *P. lamellinoda*, [p. 229.
    - *b*². Head posteriorly more or less sculptured.
      - *a*³. Frontal grooves for reception of scapes of antennæ absent .... *P. grayi*, p. 230.
      - *b*³. Frontal grooves for reception of scapes of antennæ distinct.
        - *a*⁴. Upper margin of node on 1st joint of pedicel emarginato .... *P. malinsi*, [p. 231.

b^4. Upper margin of node on 1st joint of pedicel entire, not emarginate.

a^5. Lateral lobes of head punctate . . . *P. naorojii*, p. 231.

b^5. Lateral lobes of head reticulate.

a^6. Abdomen opaque, finely striate from end to end .... *P. sharpi*, p. 234.

b^6. Abdomen not opaque, only striate at base.

a^7. Second node distinctly more than twice as broad as long.

a^8. Head, thorax and abdomen yellowish red .... *P. latinoda*, [p. 235.

b^8. Head, thorax and abdomen black or very dark brown . . *P. angustior*, [p. 236.

b^7. Second node of pedicel longer, less than twice as broad as long.

a^8. Head distinctly longer than broad .... *P. fergusoni*, [p. 234.

b^8. Head square, as broad as long .... *P. hoogwerfi*, [p. 235.

b. First joint of pedicel with no projection or appendix beneath.

a'. Pro- and mesonotum forming a single convexity, transverse mesonotal furrow obsolete.

a^2. Head only as broad as long.

a^3. Posterior half of head smooth and shining .... *P. megacephala*, [p. 242.

b^3. Posterior half of head sculptured, not smooth.

a^4. Occipital lobes longitudinally striate. Length over 6 mm. .... *P. sykesi*, p. 240.

b^4. Occipital lobes reticulate. Length under 3 mm...................... *P. sagei*, p. 243.

b^2. Head distinctly longer than broad.

a^3. Occiput smooth and shining.

a^4. Occipital emargination narrow and deep, lateral lobes broad and rounded. *P. pronotalis*, [p. 239.

b^4. Occipital emargination broad and shallow, lateral lobes narrow and angular. *P. wood-masoni*, [p. 241.

b^3. Occiput more or less sculptured.

a^4. Length over 6 mm.

a^5. Second node of pedicel with the sides produced into cones .... *P. phipsoni*, [p. 238.

b^5. Second node of pedicel with the sides not produced into cones .... *P. hospita*, [p. 238.

b^4. Length under 4 mm. [p. 237.

a^5. Head anteriorly beneath bidentate . *P. watsoni*,

b^5. Head anteriorly beneath not dentate.

a^6. Frontal grooves for reception of scapes of antennæ absent ...... *P. mus*, p. 242.

b^6. Frontal grooves for reception of scapes of antennæ present.

a^7. Thorax for the most part smooth, shining .... *P. templaria*, [p. 244.

b^7. Thorax reticulate and opaque, not shining .... *P. parva*, p. 244.

b'. Pro- and mesonotum not forming a single convexity; transverse mesonotal furrow and ridge or carina, or at any rate the latter, always present.

a^2. Posterior third of head smooth, not sculptured .... *P. nietneri*, [p. 245.

b^2. Whole head sculptured.

a^3. Head below vertex vertically truncate, forming a flat plane with the clypeus .. *P. capellini*, var. [*asperata*, p. 247.

b^3. Head below vertex normally developed, not truncate.

a^4. Mesonotum bidentate above .... *P. multidens*, [p. 257.

b^4. Mesonotum not dentate above.

a^5. Frontal grooves for reception of scape of antennæ obsolete.

a^6. Head including mandibles very large, as long as or longer than thorax and pedicel united .... *P. wroughtoni*, [p. 247.

b^6. Head including mandibles smaller, distinctly shorter than thorax and pedicel united .... *P. constanciæ*, [p. 248.

b^5. Frontal grooves for reception of scape of antennæ distinct.

a^6. Length over 7 mm. Scape flattened . *P. rugosa*, p. 249.

b^6. Length under 6 mm. Scape cylindrical.

a^7. Vertex of head with a transverse impression, broad and very distinct.

a^8. Abdomen finely striate at base only .... *P. sulcaticeps*, [p. 251.

b^8. Abdomen finely striate from end to end, opaque .... *P. yeensis*, p. 252.

b^7. Vertex of head not transversely impressed, or at most with only a slight transverse impression.

a^8. Pronotum convex, lateral tubercles quite or nearly obsolete.

a^9. Base of abdomen finely striate, remainder of abdomen smooth and shining.................. *P. fossulata*, [p. 257.

b^9. Abdomen entirely smooth and shining.

a^{10}. Medial portion of clypeus smooth and shining.

a^{11}. Frontal grooves for reception of scape not well-marked, coarsely longitudinally striate within .... *P. feæ*, p. 260.

b^{11}. Frontal grooves for reception of scape more distinct, finely sculptured within .... *P. roberti*, p. 259.

b^{10}. Medial portion of clypeus opaque, longitudinally striate.

a^{11}. Scape of antennæ comparatively long, falling short of apex of lateral lobe of head

by about one-fifth of its own length .... *P. jucunda*, [p. 256.

b^{11}. Scape of antennæ shorter, falling short of apex of lateral lobe of head by more than half its own length .. *P. javana*, p. 262.

b^{8}. Pronotum convex, lateral tubercles sometimes obtuse but always distinct.

a^{9} Second node of pedicel distinctly more than half the breadth of abdomen.

a^{10}. Head longer than broad ...... *P. horni*, p. 251.

b^{10}. Head as broad as long........ *P. rhombinoda*, [p. 250.

b^{9}. Second node of pedicel not nearly half the breadth of abdomen.

a^{10}. Clypeus medially produced, bidentate .... *P. peguensis*, [p. 258.

b^{10}. Clypeus not medially produced nor dentate.

a^{11}. Abdomen sculptured.

a^{12}. Basal third of abdomen finely striate............ *P. striativentris*, [p. 253.

b^{12}. Entire abdomen (sometimes only basal two-thirds) reticulate - punctate, not striate .... *P. ghatica*, p. 254.

b^{11}. Abdomen not sculptured, smooth and shining.

a^{12}. Longitudinal striæ on head curving outwards on posterior lateral lobes.

a^{13}. Pronotum highly polished, smooth and shining .... *P. sepulchralis*, [p. 255.

b^{13}. Pronotum more or less transversely striate.

a^{14}. Frontal grooves for reception of scape longitudinally striate within. *P. plagiaria*, [p. 261.

b^{14}. Frontal grooves for reception of scape finely reticulate within.

a^{15}. Second node of pedicel transverse, with acute lateral cones ...... *P. binghami*, [p. 261.

b^{15}. Second node of pedicel more rounded, the lateral angles more obtuse .... *P. indica*, p. 263.

b^{12}. Longitudinal striæ on head not curving outwards on posterior lateral lobes.

a^{13}. Length under 3 mm. .... *P. rogersi*, p. 258.

b^{13}. Length over 3 mm.

a^{14}. Head long, half as long again as broad ...... *P. magretti*, [p. 255.

b^{14}. Head shorter, about as long as broad.

a^{15}. Metanotal spines long, longer than half the length of the basal face of metanotum .. *P. rotschana*, [p. 264.

b^{15}. Metanotal spines very short, barely half the length of the basal face of metanotum.

a^{16}. Pronotum seen from the front rounded, convex .... *P. himalayana*, [p. 265.

b^{16}. Pronotum seen from the front flat anteriorly, transverse above .... *P. allani*, p. 264.

B. Club of flagellum of antennæ formed of apical four joints.

a. Light reddish-brown; head enormous, clypeus not carinate .... *P. smythiesi*, [p. 227.

b. Very dark brown, almost black; head proportionately much smaller, clypeus medially carinate.. *P. bhavanæ*, [p. 228.

255. **Phidole smythiesi**, *Forel, Rev. Suisse Zool.* x (1902), pp. 165 & 185, ☿ ♀ ♂; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 523 & 538.

♃. Of a clear light or reddish chestnut-brown all over, slightly shining, covered with abundant reddish-yellow erect hairs. Head enormously large, much broader than long, posteriorly deeply emarginate, with no depression on the vertex but a broad, smooth, depressed line down the middle; anteriorly finely but rather

Fig. 79.—*Phidole smythiesi*, ☿.

vaguely longitudinally striate, the striæ breaking into punctures and shallow reticulations posteriorly; mandibles punctured and sparsely striate, the masticatory margin acutely pointed at apex, without distinct teeth but slightly crenulate; clypeus longitudinally striate; antennal carinæ short and widely divergent posteriorly, no antennal groove; antennæ short, the scape from its insertion reaching barely halfway to the top of the head; flagellum clavate, the apical four joints subequal; eyes small,

placed in the lower third of the sides of the head. Thorax narrow in comparison with the head, pronotum convex anteriorly, mesonotum widely and deeply transversely sulcate and with a transverse carina; metanotum short, longitudinally sulcate, the metanotal spines stout and acute. Anterior node of the pedicel without appendix beneath, acutely transverse above; posterior node rounded above, much broader than long, slightly angularly produced at the sides; abdomen broadly oval.

☿. Similar in colour to the ♃. Head oval, convex, very little longer than broad; scape of the antennæ passing the top of the head by about one-third of its length from insertion; thorax elongate, the metanotum proportionately longer than in the ♃; pedicel as in the ♃, but the posterior node oval, longer than broad; abdomen broadly oval. Head, thorax and abdomen smooth, polished and shining, the metanotum only delicately, longitudinally striate on the sides; pilosity as in the ♃.

♀. Closely resembles the ♃, darker in colour; the head proportionately somewhat smaller, but larger than the thorax; metanotal spines broad at base.

"♂. Dull yellow. Wings long, pale brown, with the nervures and stigma rather pale. Mandibles quadridentate. Scape of the antennæ as long as the first three joints of the flagellum. Head arched transversely from one eye to the other. Thorax broad. Sometimes the 2nd node very large, with a lateral tooth." (*Forel.*)

Length, ♃ 6–8·5; ☿ 3·5–4·5; ♀ 13; ♂ 5·5–6 mm.

Hab. Assam (*Smythies*).

Remarkable for its having more than one form of ☿ as in *Phidologiton*. It is one of the two Indian species with the apical *four* instead of *three* joints of the flagellum of the antennæ subequal.

Var. *bengalensis*, Forel, has been described from Bengal. Differs by its more elongate head and longer metanotal spines.

256. **Phidole bhavanæ**, sp. nov.

♃. Dark castaneous brown, shining; antennæ and legs lighter, somewhat reddish brown; pilosity reddish yellow, abundant and long on the front of the head and on the abdomen, somewhat sparse on the thorax, on the antennæ and legs it is oblique. Head a little longer than broad, and broader posteriorly than in front, longitudinally striate, reticulate in the intervals and on the posterior lateral lobes, these latter somewhat pointed and cone-shaped, the occipital emargination wide and deep, with a medial broad longitudinally impressed line, but no transverse depression; mandibles shining, with sparsely scattered punctures; clypeus with its anterior margin transverse, not emarginate, a smooth space with a slight vertical carina in the middle; no antennal groove; antennal carinæ short, scarcely divergent; scape of antennæ stout, reaching about two-thirds of the distance between their insertion

and the top of the head; flagellum with the club formed of 4 subequal joints. Thorax anteriorly rounded, without lateral tubercles; transverse mesonotal groove and ridge well-marked; meso-metanotal suture wide and deep; metanotum with its basal portion laterally margined and strong erect lateral spines; the thorax somewhat irregularly but transversely striate, obliquely on the sides. Pedicel rather thick: the 1st node, seen from the side, cuneiform, without an appendix beneath; 2nd node globose, laterally slightly tuberculate, smooth above and shining; abdomen smooth and shining.

☿. Similar in colour, but lighter than in the ♃, smooth, highly polished and shining; pilosity similar but more sparse. Head broadly oval, with a distinct posterior margin; antennæ very long and massive, the scape extending beyond the top of the head by more than one-third of its length; club of the flagellum of 4 subequal joints as in the ♃. Thorax, nodes of the pedicel and abdomen as in the ♃, but proportionately smaller.

Length, ♃ 5; ☿ 3–3·5 mm.

Hab. Sikhim at 8000 feet (*Rogers*).

This species resembles *Phidole* (*Ceratophidole*) *smythiesi*, Forel, in the form of the antennæ. It differs in size and colour, in having the head (♃) proportionately smaller and longer, and also in the shape of the head and thorax.

257. **Phidole lamellinoda**, *Forel, Rev. Suisse Zool.* x (1902), pp. 166 & 186, ♃ ☿ ♀ ♂; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 524 & 538.

♃. Very light chestnut-red, smooth, polished and shining, antennæ, legs and abdomen a shade paler; the head anteriorly finely longitudinally striate, the thorax on the sides very sparsely punctate; pilosity entirely wanting, pubescence very short and sparse. Head posteriorly broader than in front, deeply, widely emarginate, without the mandibles a little longer than broad; mandibles sparsely punctate, the masticatory margin with two indistinct blunt teeth at apex; clypeus with the anterior margin medially incised, a convex smooth spot in the middle with a fine groove on each side; antennal carinæ very short, widely divergent posteriorly, with no antennal groove; antennæ short, the scape not reaching the top of the head by more than one-half of its length from insertion; eyes lateral, round, not very convex, placed in anterior half of the head; a distinct depression on the vertex; the posterior lateral angles of the head rounded but prominent. Thorax: the pronotum a little longer than broad, convex above, laterally tuberculate; mesonotum transverse; the pro-mesonotal suture deep and narrow, the meso-metanotal suture deep and broad; the metanotum with a curved slope to apex, the metanotal spines very short and erect. Anterior node of the pedicel with a translucent appendix beneath, seen from above square, obliquely sloped

anteriorly, the anterior lateral angles prominent, above transverse; posterior node convex above, a little more than twice as long as broad, laterally angular; abdomen broadly oval, convex.

☿. Pale brownish yellow, polished, smooth and shining; with sparse pilosity chiefly on the front of the head and apex of the abdomen, on the antennæ and legs the hairs are short and oblique; head a little longer than broad, and broad posteriorly; eyes comparatively prominent; scape of the antennæ extending beyond the top of the head by barely one-fifth of its length. Thorax bi-emarginate; anterior node of the pedicel without an appendix, posterior node oval, convex.

"♀. Precisely like the ♃, with an appendix beneath the 1st node of the pedicel." (*Forel.*)

"♂. Mandibles without teeth. Scape as long as the first two joints of the flagellum. Head behind the eyes trapezoidal. A longitudinal whitish carina on the 1st node of the pedicel. Wings yellowish, stigma and nervures paler. Of a dingy yellow; abdomen brownish." (*Forel.*)

Length, ♃ 4·5–5; ☿ 2·5; ♂ 4·8 mm.

Hab. Recorded so far only from Central (*Betham*) and Western India (*Wroughton*).

258. **Phidole grayi**, *Forel, Rev. Suisse Zool.* x (1902), pp. 167 & 187, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 524 & 539.

♃. Head, thorax and posterior node of the pedicel reddish brown, antennæ and legs yellow, abdomen brown with the apical margins of the segments narrowly yellowish; head, thorax and abdomen covered with erect pale reddish hairs, oblique, most abundant on the antennæ and on the tibiæ of the legs. Head broader posteriorly than in front, longitudinally striate, with the occiput and a portion of the vertex and front above smooth and shining; mandibles smooth, with scattered punctures; clypeus with a smooth space in the middle; antennal carinæ short, divergent posteriorly; antennal grooves shallow, sculptured inside; scape of the antennæ reaching two-thirds of the distance from its insertion to the top of the head. Thorax as in *P. lamellinoda*, the pronotum rounded and convex, but transversely striate, with the lateral tubercles less distinct; metanotal spines longer than in *P. lamellinoda*. Nodes of the pedicel and abdomen as in that species, but distinctly pilose and not so smooth, polished and shining.

☿. Head, thorax and anterior node of the pedicel yellow, the head with a brownish tint, the posterior node of the pedicel and the abdomen brown. Head posteriorly nearly transverse, the antennæ extending beyond the top by about one-third of their length. Thorax: the transverse groove or sulcus on the mesonotum shallow: the metanotum without spines, scarcely dentate. Anterior node of pedicel in profile triangular, posterior node from

above circular, strongly convex, much larger than the 1st node; abdomen oval, abundantly pilose as in the ♃.

Length, ♃ 4–4·5; ☿ 2·5 mm.

Hab. Recorded so far only from Western India (*Wroughton*) and Sikhim (*Möller*).

259. **Phidole malinsi**, *Forel, Rev. Suisse Zool.* x (1902), pp. 167 & 187, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 524 & 539.

♃. Dark castaneous brown; the antennæ, metanotum, legs and 1st node of the pedicel light reddish brown. Head, thorax and abdomen covered abundantly with erect reddish hairs. Head a little longer than broad, a little broader posteriorly than in front, longitudinally striate posteriorly and on the prominent lateral angles somewhat reticulate, depression on the vertex distinct; mandibles shining, with scattered punctures; clypeus medially shortly carinate, the anterior margin incised in the middle; antennal carinæ short, widely divergent posteriorly, antennal groove the length of the scape; the latter densely pubescent, falling short of the top of the head by about half its own length. Thorax somewhat coarsely transversely striate; the pronotum anteriorly convex, laterally tuberculate; mesonotum with a transverse groove and a ridge behind the groove; metanotum smooth and shining above, sculptured on the sides, the metanotal spines short and erect. Anterior node of pedicel cuneate, with a thin, slightly bituberculate, transverse upper margin, beneath with a semitransparent appendix, bearing a spine anteriorly; posterior node convex, transversely finely striate, about twice as broad as long; abdomen broadly oval, finely longitudinally striate on the basal half of the 1st segment.

☿. Pale yellowish brown, polished, smooth and shining, abdomen darker brown; head oval, the occiput rather broad; scape of the antennæ extending beyond the top of the head by about one-fourth of its length from insertion. Thorax: the mesonotal transverse groove slight, the metanotal spines erect but very short. Anterior node of pedicel without appendix beneath; posterior node oval.

Length, ♃ 4·5–5; ☿ 2·5 mm.

Hab. Recorded so far only from Sikhim (*Möller*) and Ceylon (*Yerbury*).

260. **Phidole naorojii**, *Forel, Rev. Suisse Zool.* x (1902), pp. 167 & 187, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 525 & 539.

♃. Head and thorax brownish red, darkest on the head, legs dingy yellow, abdomen dark brown; pilosity very sparse; pubescence widely spaced, short but very distinct on the head and abdomen; head in front longitudinally, the pronotum transversely striate, the apex of the lateral lobes of the head, the occiput, metanotum and posterior node of the pedicel more or less coarsely and closely punctured, opaque; abdomen smooth. Head nearly square, the

occipital emargination not deep; mandibles smooth, sparsely punctured; clypeus anteriorly transverse, medially vertically carinate; antennæ short, the scape falling short of the top of the head by about half its length; antennal grooves shallow, not distinct. Thorax somewhat short and robust, the pronotal tubercle obtuse, the transverse mesonotal groove and ridge distinct; the metanotum short, flat and trapeziform above; spines comparatively long. Pedicel short: the 1st node squamiform, emarginate above, with a short appendix beneath; 2nd node above transversely fusiform, about twice as broad as long; abdomen depressed, almost circular.

☿. Head above and abdomen dark brown; the front of the head, mandibles, antennæ, thorax and legs yellow. Head oval, not very arched posteriorly, with a distinct posterior margin; antennæ with the scape extending by about a quarter of its length beyond the top of the head. Thorax: the pronotum convex and rounded above, with minute lateral tubercles, the mesonotal transverse furrow barely indicated, the metanotum long, bidentate posteriorly. Pedicel: the 1st node small, squamiform; 2nd proportionately large, from above circular, rounded and convex above; abdomen broadly oval, highly polished and shining.

Length, ♃ 4–4·5; ☿ 2 mm.

Hab. Western India, Poona (*Wroughton*).

261. **Phidole spathifera**, *Forel, Rev. Suisse Zool.* x (1902), pp. 168 & 187, ♃ ☿ ♀ ♂; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 525 & 539.

♃. Head, posterior node of the pedicel and abdomen dark brown, almost black, the last with the apical margins of the segments yellowish; flagellum of the antennæ, thorax, legs and pedicel anteriorly chestnut-red; the whole insect covered with abundant short red hairs, and closely striate-reticulate, opaque.

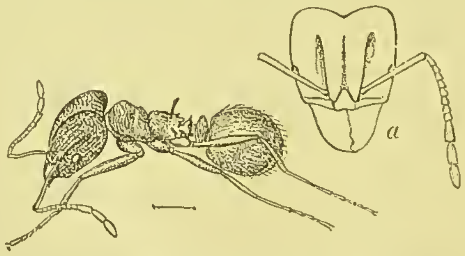

Fig. 80.—*Phidole spathifera*, ♃. *a*. Head.

Head without the mandibles about as broad as long, rather widely but not deeply emarginate posteriorly; mandibles not dentate, smooth along the masticatory margin; clypeus medially narrowly carinate, with the anterior margin bisinuate; antennal carinæ short,

slightly divergent posteriorly; antennal grooves as long as the scape; the latter reaching somewhat less than two-thirds of the distance between its insertion and the top of the head; eyes comparatively small, placed in the anterior half of the head, on the sides. Thorax: the pronotum convex in front, laterally bituberculate; mesonotum with a transverse carina, the meso-metanotal suture deeply and widely impressed, the sculpture on the pro- and mesonotum transverse; metanotum broad, passing to the apex with a rounded curve, the basal portion posteriorly with two lateral clavate spines or processes. Anterior node of the pedicel viewed from the front somewhat square, deeply emarginate above, the lower and anterior lateral and the upper lateral angles dentate, beneath with a semitransparent laminate appendix; posterior node transverse, convex above, laterally bituberculate, about twice as broad as long; abdomen from above very broadly oval, nearly circular.

☿. Similar in colour and pilosity to the ♃; the sculpture much finer and more delicate, rugulose and opaque. Head broadly oval, convex, mandibles minutely dentate along the masticatory margin; scape of the antennæ extending for about one-fourth of its length beyond the top of the head; thorax in shape a miniature of that of the ♃, but the metanotal spines short, erect, acute at apex, not clavate. Pedicel with the 1st node scarcely emarginate above, but with an appendix beneath; 2nd node seen from above convex, upper side almost circular; abdomen elongate, oval.

♀. Resembles the ♃, but the head is only a little broader than the thorax, broader than long and markedly broader posteriorly than in front. Head somewhat coarsely, mesonotum and the base of the abdomen more finely longitudinally striate; pronotum (which is depressed beneath the mesonotum) and the 2nd node of the pedicel transversely striate; scutellum, the apical two-thirds of the 1st and the whole of the rest of the abdominal segments smooth and shining. Pilosity as in the ♃. Metanotal spines short and acute.

"♂. Head broader than long, feebly convex behind the eyes. Mandibles tridentate. Scape shorter than the 2nd joint of the flagellum. Nodes of pedicel short and thick, without any appendix. Wings brownish .... nervures and stigma brown. Head and thorax opaque, finely sculptured and pubescent. Pubescence dense, with only a few erect hairs. Deep brown; legs and antennæ yellowish." (*Forel.*)

Length, ♃ 5·5–6·5; ☿ 3–3·5; ♀ 7·5–8; ♂ 5 mm.

Hab. Barrackpore (*Rothney*); Western India, the Nilgiris (*Wroughton*) to Cochin (*Rothney*); Ceylon (*Yerbury*); Assam (*Smythies*); Burma, Pegu Yoma (*Hauxwell*). The Cochin, Assam and Burmese specimens have the metanotal spines obtuse but not clavate, and the 2nd node of the pedicel three times as broad as long. This variety has been separated as var. *aspatha* by Dr. Forel. The Ceylon form (var. *yerburyi*, Forel) has the head strongly medially impressed and the 1st node of the pedicel very slightly emarginate above.

262. **Phidole fergusoni**, *Forel, Rev. Suisse Zool.* x (1902), pp. 169 & 188; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 526 & 540.

♃. Head, thorax and pedicel deep ferruginous red; abdomen dark brown, almost black in some specimens. Head, thorax and pedicel coarsely sculptured, the head with longitudinal striæ breaking into coarse reticulations posteriorly on the lateral lobes, the thorax and pedicel with coarse punctures and transverse striæ, abdomen finely longitudinally striate; pilosity abundant, of a pale yellowish colour. Head nearly square, slightly constricted anteriorly, with a shallow impression on the vertex; mandibles longitudinally striate and punctured; clypeus with a short medial vertical carina; antennæ somewhat short, the apex of the scape falling short of the top of the head by nearly its own length; antennal grooves not distinct; occipital emargination moderately deep. Thorax with the pronotal lateral tubercles, the transverse mesonotal groove and carina all very strongly marked; metanotum short, the spines remarkably stout, but short and obtuse. Pedicel: the 1st node with its upper margin transverse and with a triangular appendix beneath; 2nd node barely twice as broad as long, its lateral angles obtuse; abdomen broadly oval, depressed, truncate anteriorly.

☿. Similar in colour to the ♃; head, thorax and pedicel closely punctured, opaque; abdomen smooth and shining, sparsely punctured at base only. Pilosity as in the ♃. Head oval, the occiput rounded, convex, the antennæ stout, pubescent, the scape extending beyond the top of the head by about one-fourth of its length. Thorax elongate, the transverse mesonotal groove and ridge not well-marked, the basal portion of the metanotum not horizontal, slightly sloping, the metanotal spines short, acute and erect. Pedicel elongate, the 1st node almost conical, the 2nd node globose, much broader and longer; abdomen oval.

Length, ♃ 6–6·5; ☿ 3·5–4 mm.

Hab. Recorded so far only from Travancore (*Ferguson*).

263. **Phidole sharpi**, *Forel, Rev. Suisse Zool.* x (1902), pp. 169 & 188, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 526 & 540.

♃. Head, thorax and 1st node of the pedicel brownish red, 2nd node of the pedicel and abdomen dark brown; head, thorax and abdomen covered with soft, rather long erect hair, raised on piligerous tubercles on the abdomen. Head broad, narrowing anteriorly, with a deep transverse depression on the vertex and the occipital emargination broad and shallow; cheeks convex, the whole front of the head and cheeks longitudinally striate, the striæ breaking into coarse reticulations on the posterior lobes; mandibles smooth, sparsely punctured; clypeus with a smooth space in the middle carinate, and the anterior border emarginate; antennal carinæ short, antennal groove shallow, scape of the antennæ falling short of the top of the head by about half its own length. Thorax transversely striate, the pronotum convex ante-

riorly, the lateral tubercles distinct but obtuse; the transverse furrow on the mesonotum wide and shallow; the metanotum broad and flat, the metanotal spines stout. Pedicel: the 1st node in profile triangular, its upper margin transverse, entire, beneath with a short rounded appendix; 2nd node transversely striate, about twice as broad as long; abdomen broadly oval, densely longitudinally striate and opaque.

☿. Head and abdomen dark chestnut-brown, the former smooth and shining; the antennæ, thorax, legs and pedicel yellowish brown; the mesonotum and metanotum delicately sculptured; the abdomen dull, almost opaque. Head oval, rounded and narrowed posteriorly; the antennæ stout, the scape extending beyond the top of the head by about one-third of its own length. Mesonotal transverse groove shallow; metanotum elongate, unarmed, with a gentle slope posteriorly. Pedicel: the 1st node conical, the 2nd very much larger, oval, convex above; abdomen broadly oval.

Length, ♃ 5·5–6; ☿ 2·5 mm.

Hab. Western (*Hoogwerf*) and Southern India (*Sharp*, *Rothney*); Burma, Pegu Yoma (*Allan*).

Specimens I got in Burma agree so closely with Dr. Forel's description that, although they differ in the length of the scape of the antennæ and slightly in colour, I prefer to place them under this species.

264. **Phidole hoogwerfi.**

Pheidole sharpi, *Forel, race* hoogwerfi, *Forel, Rev. Suisse Zool.* x (1902), pp. 170, ♃, & 189, ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 526 & 540.

♃. Closely resembles *P. sharpi*, Forel, has similar pilosity and sculpture; but in the one specimen I have, that I identify as this species, the head and thorax are light ferruginous-red, the abdomen brown; the antennæ are distinctly longer, extending to more than half the distance between their insertion and the top of the head, the appendix beneath the 1st node of the pedicel is comparatively shorter and thicker, and the 2nd node is longer, being not quite twice as broad as long; lastly, the abdomen is smooth and shining except around the base, where it is densely striate.

"☿. A little lighter in colour than the ☿ of *P. sharpi*, but for the rest identical" (*Forel*).

Length, ♃ 4·5; ☿ 2·5 mm.

Hab. Bombay (*Hoogwerf*); Mysore (*Watson*).

265. **Phidole latinoda**, *Roger, Berlin. ent. Zeits.* vii (1863), p. 195, ♃; *Forel, Rev. Suisse Zool.* x (1902), pp. 170 & 189; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 527 & 540.

♃. Light bright chestnut-red, slightly shining, covered with abundant soft, erect, reddish hairs. Head broader posteriorly than in front, the vertex with a broad, very distinct transverse impression, the head anteriorly longitudinally striate, the occiput and

the posterior lateral lobes coarsely reticulate, the broad longitudinally impressed medial line finely transversely striate; mandibles smooth, polished, shining, delicately punctured; clypeus with its anterior margin medially bi-angular, above which is a V-shaped depression; antennal carinæ short, divergent; antennal groove shallow, as long as the scape; this latter short, extending for little more than half the distance between its insertion and the top of the head. Thorax transversely striate anteriorly, the transverse mesonotal groove and ridge and transverse emargination at the meso-metanotal suture distinct; basal face of the metanotum flat, square, submargined laterally; metanotal spines erect and stout. Anterior node of the pedicel smooth and shining, with a transverse margin above, beneath with a laterally compressed rounded appendix; posterior node twice as broad as long, rounded above; abdomen broadly oval, shining, finely and closely longitudinally striate at base.

☿. Pale brownish yellow, the head and abdomen darker than the thorax, the whole insect shining but covered somewhat densely with pale yellow erect hairs; head oval, eyes comparatively large; thorax elongate, the pro-meso- and meso-metanotal sutures distinct, the transverse mesonotal groove slight, the basal portion of the metanotum longer than broad, flat, the metanotal spines stout. Pedicel elongate, the 1st node with an indistinct appendix beneath, the 2nd node from above circular, convex; abdomen oval.

Length, ♃ 6–6·5; ☿ 2·5–3 mm.

Hab. Throughout continental India and Ceylon.

A large form common in Bengal stands as var. *major*, Forel.

266. **Phidole angustior**, *Forel.*

Pheidole latinoda, *Roger, race* angustior, *Forel, Rev. Suisse Zool.* x (1902), pp. 170 & 189; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 527 & 540.

♃. Head, thorax and 1st node of the pedicel dark castaneous brown, flagellum of the antennæ and legs light brownish red, 2nd node of the pedicel and the abdomen black. Head, thorax and abdomen covered with long erect red hairs; head broader posteriorly than in front, with an indistinct or no transverse impression on the vertex, closely longitudinally striate; mandibles shining, sparsely punctured; clypeus medially shortly carinate, anteriorly emarginate in the middle; antennal carinæ short, posteriorly divergent, antennal groove distinct, finely sculptured within; scape of the antennæ extending about two-thirds of the distance between its insertion and the top of the head. Thorax anteriorly convex and transversely striate, the transverse mesonotal groove shallow, the thorax deeply emarginate at the meso-metanotal suture; the basal portion of the metanotum flat, longer than broad; metanotal spines stout, erect and acute. Pedicel: the 1st node cuneiform, the upper margin transverse, slightly emarginate, a rounded laterally compressed appendix beneath; 2nd node not

quite twice as broad as long, rounded above and at the sides, and transversely striate ; abdomen broadly oval.

☿. Dark castaneous brown, smooth and shining, but densely pilose, the flagellum of the antennæ, the legs and abdomen reddish brown. Head oval, very narrow posteriorly; antennæ long, the scape extending beyond the top of the head by fully one-fourth of its length. Thorax elongate, the pro-meso- and meso-metanotal sutures well marked, the transverse mesonotal groove slight, the metanotal spines stout, erect and acute. Pedicel : the 1st node as in the ♃, but with no appendix beneath; 2nd node convex above, longer than broad; abdomen elongate, oval, somewhat attenuate towards the apex.

Length, ♃ 5–5·5 ; ☿ 3–3·5 mm.

Hab. Western India (*Wroughton*), Burma (*Bingham*).

267. **Phidole watsoni**, *Forel, Rev. Suisse Zool.* x (1902), pp. 171 & 189, ♃ ☿ ♀ ♂; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 527 & 541.

♃. Head, thorax and pedicel reddish brown, the head anteriorly sometimes marked with yellow, antennæ and legs yellow; abdomen brown, sometimes more or less dingy whitish yellow stained with brown above. Head anteriorly in front longitudinally striate, the striæ diverging laterally and breaking into reticulations on the lateral lobes; the thorax and abdomen shining. Head, thorax and abdomen sparsely covered with soft, short, erect hairs. Head elongate, rectangular, much longer than broad, slightly constricted posteriorly, beneath anteriorly bidentate, the occipital emargination shallow, the cheeks very slightly convex, almost straight; mandibles smooth, slightly punctured; clypeus a little concave, not carinate ; antennæ short, the scape barely one-third as long as the distance from its insertion to the top of the head; antennal groove very indistinct, indicated only by a smooth elongate space on which the scape rests. Thorax gibbous anteriorly, the pronotum transverse, somewhat flat above and bituberculate, the mesonotal transverse groove and ridge not well-marked ; metanotum with the basal portion horizontal, flat and shining, metanotal spines short, acute and erect. Pedicel with the 1st node squamiform, rather thick, transverse above, the petiole in front long; 2nd node a little wider and larger, somewhat rhombiform ; abdomen oval.

☿. Clear pale yellow, head darker, the abdomen stained with brownish. Head nearly as broad as long, the posterior margin rounded ; antennæ short, the apex of the scape extending only up to the top of the head; thorax proportionately rather long, the basal portion of the metanotum bidentate posteriorly, larger than the apical portion; pedicel with the nodes subequal; abdomen oval.

Length, ♃ 3; ☿ 1·5 mm.

Hab. Bengal (*Taylor*); Ceylon (*Rothney*); Upper Burma, Myingyan (*Watson*); Southern Shan States (*Thompson*).

268. **Phidole phipsoni**, *Forel, Rev. Suisse Zool.* x (1902), pp. 171 & 190, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 528 & 541.

♃. Head, the thorax and pedicel in part, the coxæ, trochanters, base and apex of the femora and of the tibiæ, and the whole of the tarsi reddish brown; the pronotum, metanotum, nodes of the pedicel above. and abdomen black, the posterior margins of the abdominal segments narrowly yellow. Pilosity reddish, very abundant and long. Head much longer than broad, the sides parallel, the occipital emargination V-shaped, deep, the whole head longitudinally striate, reticulate posteriorly between the striæ; mandibles shining, the apex obtuse; clypeus with a short medial carina inside a medial longitudinal depression; antennæ short, antennal grooves shallow. Thorax: the pro- and mesonotum form one convexity, viewed in profile the thorax is emarginate at the meso-metanotal suture; metanotum with a distinct basal portion sloping forward, bituberculate at apex. Pedicel thick, opaque, coarsely sculptured; anterior node broader than long, its upper margin transversely rounded, no appendix beneath; posterior node convex above, nearly twice as broad as long, the lateral angles attenuate and acute; abdomen broadly oval, finely, closely punctured and opaque.

☿. Head, thorax and abdomen reddish brown, antennæ and legs brownish yellow. Pilosity as in the ♃. Head oval; antennæ very long, the scape extending beyond the top of the head by about one-third of its length. Thorax: the pro- and mesonotum and emargination at the meso-metanotal suture as in the ♃, metanotal spines absent; posterior node of the pedicel conical, not so long and oval as in most species.

Length, ♃ 5·5–6·5; ☿ nearly 3 mm.

Hab. Recorded only from Western India, Kanara (*Wroughton*).

269. **Phidole hospita**, sp. nov.

♃. Head and pedicel chestnut-red, thorax and abdomen very dark brown, nearly black, mandibles much darker, antennæ and legs slightly lighter in colour than the head; head regularly longitudinally striate, the striæ slightly divergent above the vertex, oblique but not transverse on the lateral lobes; posteriorly the head is more or less smooth on the occiput and on the back of the lateral lobes; thorax longitudinally and somewhat irregularly finely striate on the sides, the striæ curving round the front of the pronotum and transverse above on the basal portion of the metanotum; the pronotum and mesonotum above are smooth and shining, with one or two scattered punctures; pedicel and abdomen smooth with a few irregular punctures, abdomen highly polished and shining; pilosity almost entirely wanting. Head with the mandibles from the front almost shield-shaped, very much broader posteriorly than in front, the occipital emargination wide and moderately deep, the lateral lobes of the head large and rounded above, a well-marked and tolerably deep transverse impression above the

vertex; mandibles very powerful, triangular, smooth and shining, with a few fine shallow punctures, but not striate; clypeus smooth, the medial portion broadly triangular, well-defined posteriorly, anteriorly transverse; antennal carinæ short and divergent, continued as divergent striæ margining the well-marked antennal hollow or groove for the reception of the scape; this latter somewhat coarsely sculptured within; antennæ short and slender, the scape falling short of the top of the head by more than one-third of its length; eyes small, placed in the anterior half of the head. Thorax: the pro- and mesonotum form one convexity, not raised, but slightly convex above, the pro-mesonotal transverse groove barely indicated, the transverse ridge or carina behind it obsolete; the basal portion of the metanotum short, slightly convex above, the metanotal spines very acute and erect. Pedicel: the 1st node fine, narrow but transverse, and not emarginate above, without appendix beneath; 2nd node from above subquadrate, as broad as long, the angles rounded and the sides not produced into cones; abdomen depressed, broadly oval.

Length, ♃ slightly over 6 mm.

Hab. I procured a single ♃ on the *maidan* at Calcutta. It was wandering about a nest of *P. rhombinoda*, with the ☿ ☿ and ♃ ♃ of which it seemed to be on quite friendly terms.

270. **Phidole pronotalis**, *Forel, Rev. Suisse Zool.* x (1902), pp. 173 & 190, ♃ ☿ ♂; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 528 & 541.

♃. Head yellowish red, antennæ, thorax and legs yellow, abdomen yellow shaded with fuscous brown. Head, thorax and abdomen covered with somewhat sparse, erect, pale yellow hairs. Head remarkably narrow and long, twice as long without the mandibles as it is broad posteriorly; occipital emargination very deep and narrow, the posterior lateral angles of the head very blunt and rounded; head longitudinally striate, more distinctly on the anterior half, the apex of the posterior lateral lobes smooth and shining; mandibles sparsely punctured; clypeus with a medial triangular portion slightly depressed, smooth and shining; antennal carinæ short, divergent posteriorly, but continued as a margin to the long broad antennal furrow, which curves towards the eyes so as to contain a portion of the flagellum as well as the scape of the antennæ, the scape falls short of the apex of the lobes of the head by about one-third of its length. Thorax emarginate in profile at the meso-metanotal suture; the pro- and mesonotum form one convexity, the pronotum laterally tuberculate; metanotal spines short, erect, acute. Anterior node of the pedicel without appendix beneath, in profile triangular, upper margin transverse, narrow, slightly emarginate; posterior node somewhat thicker and broader, but transverse, rounded above: abdomen broadly oval, smooth, polished and shining.

☿. Shining brownish yellow, the head a shade darker than the

rest of the body, more or less oval, broad posteriorly; scape of the antennæ short, extending very little beyond the top of the head. Thorax: pro- and mesonotum form one convexity and are emarginate in profile at the meso-metanotal suture as in the ♃; metanotal spines minute but erect and acute; nodes of the pedicel proportionately as in the ♃; abdomen oval.

♂. Head and thorax fuscous brown, opaque; mandibles, clypeus, antennæ, legs and abdomen yellow, shining. Head subcircular, eyes and ocelli enormous, clypeus convex; antennæ long, the scape short, equal in length to the basal three joints of the flagellum. Thorax massive, oval, the mesonotum broad and somewhat flat. Nodes of the pedicel low, subequal; abdomen broadly oval. Wings brownish or yellowish white, the nervures and stigma yellow.

Length, ♃ 3·5–4·5; ☿ 1·5–2; ♂ 4·5 mm.

Hab. Recorded only from Sikhim (*Möller*) and Ceylon (*Yerbury*).

271. **Phidole sykesi**, *Forel, Rev. Suisse Zool.* x (1902), p. 173, ♃ ☿ ♂ ♀; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 529 & 541.

♃. Dark brownish or chestnut-red, the flagellum of the antennæ, the thorax and legs a shade lighter. Head, thorax and abdomen abundantly covered with soft, erect, red hair. Head very large, closely longitudinally striate, longer than broad, the posterior lateral lobes broadly rounded; mandibles sparsely punctured; clypeus with a triangular medial portion depressed, smooth and shining; antennal carinæ short, divergent posteriorly; no antennal groove; antennæ short, the apex of the scape scarcely reaching half the distance from its insertion to the top of the head. Thorax polished and shining, emarginate at the meso-metanotal suture, the pro- and mesonotum form one convexity; metanotal spines short, stout, acute. Pedicel without an appendix beneath the 1st node, this latter squamiform, its upper margin short, laterally bidentate; 2nd node transverse, about twice as broad as the 1st node, its upper margin rounded, produced laterally into cones; abdomen broadly oval.

☿. Bright light chestnut, the abdomen brown, covered with abundant erect reddish hairs; head, thorax anteriorly and abdomen smooth, polished and shining, the sides of the thorax posteriorly delicately, longitudinally striate. Head posteriorly somewhat transverse and broader than in front; antennæ comparatively stout, the scape extending beyond the top of the head by about one-fourth of its length. Thorax emarginate at the meso-metanotal suture; metanotum without spines. Anterior node of the pedicel squamiform; posterior node oval, nearly circular, a little broader posteriorly than in front.

♀. Resembles the ♃ in colour, head smaller proportionately; thorax smooth, sparsely punctured, metanotal spines stout, broad at base; anterior node of the pedicel as in the ♃, posterior node broader. Wings subhyaline, nervures and stigma yellowish.

"♂. Mandibles tridentate, narrow at base. Scape shorter than the basal two joints of the flagellum united. Head posteriorly trapeziform. Of a dingy brownish-yellow colour. Metanotum with two rounded elevations. Sculpture, wings and pilosity as in the ♀ and ♃." (*Forel.*)

Length, ♃ 6·5–7·5; ☿ 3–3·5; ♀ 10; ♂ 6 mm.

Hab. North-west Provinces (*Smythies*); Central (*James*) and Western India (*Wroughton*).

272. **Phidole wood-masoni**, *Forel, Jour. As. Soc. Beng.* liv, pt. 2 (1885), p. 180, ♃ ♀; *Rev. Suisse Zool.* x (1902), pp. 173 & 191, ♃ ☿ ♀ ♂; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 529 & 541.

♃. Bright, rather light yellow, the mandibles brown, abdomen fuscous brown; head, thorax and abdomen covered with rather long semi-erect pale yellow hairs, most abundant on the abdomen; head nearly twice as long as broad, rectangular; mandibles smooth, sparsely punctured, with two acute teeth at apex; clypeus narrow and transverse; antennal carinæ short, divergent posteriorly, no antennal groove; scape of the antennæ barely reaching one-third of the distance between their insertion and the top of the head; eyes very small, placed on the sides in the anterior fourth of the head; head shining, anteriorly finely striate, the posterior half sparsely punctured. Thorax: the pro- and mesonotum broad, forming one convexity, the former laterally tuberculate, the latter vertical posteriorly, the basal portion of the metanotum depressed and level, the metanotal spines very short, erect. Nodes of the pedicel subequal, in profile conical, rounded above, with no appendix beneath; abdomen broadly oval.

☿. Light yellow all over, shining; head posteriorly very slightly but distinctly emarginate; antennæ short, the scape barely reaching to the top of the head; thorax smooth and shining, the same shape in miniature as in the ♃. Posterior node of the pedicel slightly larger than the anterior node; abdomen oval.

♀. Brownish yellow; head as broad as long, entirely longitudinally striate, except a smooth elongate space for the scape; thorax and abdomen smooth and shining, the metanotum strongly bidentate; the posterior node of the pedicel with its lateral angles acute. Pilosity similar to that in the ♃, but more dense.

"♂. Mandibles bidentate. Scape barely so long as the basal two joints of the flagellum, of which the 2nd is a little longer than broad. Head posteriorly trapeziform, the sides oblique, the posterior margin short, the head opaque, finely striate and reticulate. The rest of the insect smooth and shining, like the ♀ and ♂ of *P. sykesi*. Pale yellow, head brownish yellow; wings yellowish, subhyaline, elongate." (*Forel.*)

Length, ♃ 2·5–4; ☿ 1·5; ♀ 4·5–5; ♂ 3·5 mm.

Hab. Spread sparingly through Continental India and Ceylon.

273. **Phidole megacephala,** *Fabr.* (Formica) *Ent. Syst.* ii. 1793, p. 361; *Forel, Rev. Suisse Zool.* x (1902), p. 173, ♃; *id. Jour. Bomb. N. H. Soc.* xiv (1902), p. 529.

♃. Yellowish brown all over, darkening towards the apex of the abdomen. Pilosity pale, very sparse and short. Head, thorax and abdomen shining, for the most part smooth, head with a few slight longitudinal striæ anteriorly, effaced half way up; thorax with a few fine and, on the metanotum, rather closely-set punctures. Head proportionately very large, longer than broad, the occipital emargination shallow, the lateral lobes rounded, convex and highly polished, a somewhat deep longitudinal medial depression on the vertex, continued as an impressed line partially down the front; mandibles punctured, shining; clypeus slightly emarginate medially, not carinate; antennæ short, slender, the scape falling short of the top of the head by about half its length; no antennal groove. Thorax anteriorly rounded, gibbous, the lateral pronotal tubercles slight, obtuse; the mesonotal transverse groove and ridge barely indicated; metanotum depressed, flat above, the metanotal spines comparatively stout and erect. Pedicel: the 1st node squamiform, with a distinct transverse upper margin; the 2nd node much broader, transverse, nearly twice as broad as long; abdomen broadly oval.

☿. Brownish yellow all over, the head and abdomen slightly darker. Head, thorax and abdomen smooth and shining; pilosity as in the ♃. Head broadly oval, slightly constricted anteriorly and posteriorly, with a distinct occipital margin; antennæ short and slender, the scape only extending slightly beyond the top of the head. Thorax moderately broad and convex anteriorly, the transverse mesonotal groove barely indicated, the metanotum dentate posteriorly, flat above. Pedicel comparatively long, the 1st node squamiform, the 2nd globose; abdomen broadly oval.

Length, ♃ 3·5–4; ☿ 2–2·5 mm.

Hab. Recorded within our limits only from Burma (*Fea, Bingham*), but this species is found in Africa and extends, or has been introduced, into many parts of the tropics of both hemispheres.

274. **Phidole mus,** *Forel, Rev. Suisse Zool.* x (1902), pp. 173 & 191, ♃ ☿ ♂; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 529 & 542.

♃. Head and thorax dark castaneous brown; abdomen, pedicel, legs and scape of the antennæ reddish brown, tarsi and flagellum of the antennæ yellowish. Head finely but very densely longitudinally striate and pubescent, much longer than broad, and about as broad posteriorly as in front, with the sides convex; mandibles smooth, minutely punctured; clypeus with its anterior margin transverse, not emarginate in the middle; antennal carinæ very short; no antennal groove; scape of antennæ falling short of the top of the head by about its own length from insertion. Thorax obscurely transversely striate; the pronotum laterally

tuberculate, forming with the mesonotum one convexity; mesonotum with no transverse groove, metanotal spines short, stout and acute. Pedicel short: 1st node subcuneiform, transversely rounded above, with no appendix beneath; 2nd node from above circular, about as broad as long; abdomen broadly oval.

☿. Head and thorax dark brown; antennæ, legs and abdomen brownish yellow. Head, thorax and abdomen with a few scattered erect pale hairs, antennæ and legs with a dense pale pubescence. Head finely and closely punctured, opaque, longer than broad, the occiput broad and slightly emarginate, the scape of the antennæ barely reaching, not extending beyond, the top of the head. Thorax sculptured like the head, opaque, broad anteriorly, the pronotum laterally tuberculate or sub-tuberculate; metanotum laterally dentate, its basal portion flat, longer than broad. Pedicel seen from above elongate; the 1st node rounded above, only slightly smaller than the 2nd node, this latter circular, no appendix beneath; abdomen oval.

"♂. Mandibles tridentate. Antennæ as in *P. wood-masoni*; head behind the eyes shorter. Metanotum depressed. Sculpture as in *P. wood-masoni*, but some fine striæ on the thorax; pilosity more sparse. Brownish yellow. Wings short, with a brownish tint, nervures and stigma pale." (*Forel.*)

Length, ♃ 2; ☿ 1·5; ♂ 3·2 mm.

Hab. Recorded hitherto only from Calcutta (*Rothney*) and Kanara (*Wroughton*).

275. **Phidole sagei**, *Forel, Rev. Suisse Zool.* x (1902), pp. 174 & 192, ♃ & ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 530 & 542.

"♃. Head broad, nearly as broad as long, the sides somewhat convex. Pronotal tubercles obtuse. Eyes placed in the anterior fourth of the head. Mandibles smooth, with scattered punctures. Clypeus carinate and emarginate. A place for the scape and flagellum, more feebly sculptured within. Scape short, relatively about the length it is in *P. sykesi*. A wide transverse impression on the vertex. Occipital emargination moderately deep. Abdomen and the head posteriorly smooth, rest of the insect finely reticulate and opaque. The head, moreover, somewhat finely and closely longitudinally striate, the occiput in part reticulate. Some transverse striæ on the pronotum. Ferruginous red. Abdomen brown. Legs and antennæ yellowish." (*Forel.*)

"☿. Identical with the ☿ of *P. mus*, Forel, but more robust; pro-mesonotum more convex. Spines thicker, longer (about as long as half of the basal face of the metanotum); front of the head more striate. Colour of a brownish-red ferruginous. Head nearly square." (*Forel.*)

Length, ♃ 2·5; ☿ 1·8 mm.

Hab. Recorded hitherto only from Dharmsála in the North-west Himalayas (*Sage*).

276. **Phidole templaria**, *Forel, Rev. Suisse Zool.* x (1902), p. 174; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 530 & 542.

♃. Dark chestnut-brown, the antennæ, legs and pedicel anteriorly yellowish brown; head, thorax and abdomen covered abundantly with soft, erect, red hairs. Head slightly shining, rectangular, narrow, very much longer than broad, anteriorly longitudinally striate, the striæ posteriorly and laterally becoming broad reticulations; mandibles smooth; clypeus not carinate, medially smooth, its anterior margin irregularly waved; antennal carinæ short, divergent, no regular antennal groove, but above, where the apex of the scape rests, there is an oblique depression; scape of antennæ short, barely reaching half the distance from insertion to the top of the head. Thorax slightly shining, the sides rather feebly sculptured; the pro- and mesonotum form a single convexity roundly cone-shaped, raised high above the metanotum, the mesonotum without the transverse groove and ridge; the basal portion of the metanotum flat, submargined at the sides, the metanotal spines comparatively long and acute. Pedicel: the 1st node in profile triangular, petiolate in front; 2nd node rounded above, a little broader than long; both nodes slightly incised above; abdomen very broadly oval.

☿. Light chestnut-brown, smooth and shining; antennæ and legs yellowish brown; head oval, with a broad posterior margin; antennæ stout, extending beyond the top of the head by about one quarter of its length. Thorax: the pro- and mesonotum raised, rounded above, forming one convexity; the metanotum short, basal portion flat, the lateral spines short, erect and acute. Pedicel and nodes like those of the ♃ in miniature; abdomen oval.

Length, ♃ 3; ☿ 1·8–2 mm.

Hab. Dr. Forel records this species from Nissor in the N.W. Himalayas; I obtained it in Sikhim at 6000 ft. elevation.

277. **Phidole parva**, *Mayr, Novara Reise, Formicid.* 1865, p. 98, ♃ ☿, pl. iv, fig. 28 *a, b*, ♃; *Forel, Rev. Suisse Zool.* x (1902), pp. 175 & 192, ♃ ☿ ♀ ♂; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 530 & 542.

♃. Head, thorax and pedicel reddish brown, the latter two lighter in colour than the head; abdomen brown; mandibles, antennæ and legs dark yellow; head, thorax and abdomen covered moderately with short, soft, semi-erect pale hairs. Head longitudinally striate, elongate, very much longer than broad, constricted posteriorly, the occipital emargination wide, the lateral lobes prominent; mandibles smooth, clypeus not emarginate anteriorly; antennæ short, the scape reaching only to about one-third of their length from insertion to the top of the head; antennal groove shallow, reticulate within. Thorax finely reticulate-punctate, opaque, the pronotal tubercle distinct; the transverse mesonotal groove shallow, the ridge posterior to it not well-marked; meta-

notum short, with the basal and apical portions subequal, the metanotal spines proportionately rather stout and acute. Pedicel comparatively long: the 1st node squamiform, high, transverse above, with no appendix beneath; the 2nd node transverse, laterally cone-shaped; abdomen short, depressed, smooth and shining.

☿. Reddish brown; antennæ and legs yellowish. Head oval, longitudinally striate; antennæ comparatively long, the scape passing beyond the top of the head by about one-third of its length. Thorax short, convex anteriorly; the metanotal spines short and stout.

♀. Reddish brown, the head in front, the antennæ and legs yellowish red. Pilosity moderately plentiful. Head square, as broad as the thorax, smooth; the mesonotum with obsolete longitudinal striæ; the metanotum opaque, punctured; metanotal spines stout, acute; wings brownish hyaline, nervures brown. Abdomen smooth and shining.

"♂. Mandibles bidentate. Antennæ as in *P. wood-masoni*, but the 2nd joint of the flagellum nearly twice as long as broad. For the rest as in *P. wood-masoni* ♂, but the wings browner, the whole colour of a more brownish yellow (head brownish), the thorax more depressed, the pilosity of the tibia oblique." (*Forel.*)

Length, ♃ 3–3·2; ☿ 1·5–2; ♀ 4–4·5; ♂ 2·8–3·2 mm.

Hab. Western India (*Wroughton*); Ceylon (*Green*); Burma (*Bingham*).

278. **Phidole nietneri**, *Emery, Deut. ent. Zeit.* 1901, p. 118, ♃ ☿; *Forel, Rev. Suisse Zool.* x (1902), p. 175, ♃; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 531 & 543.

♃. Brownish yellow, the head on the vertex, the pronotum above, the 2nd node of the pedicel and abdomen brown, the antennæ and legs slightly lighter brownish yellow; pilosity abundant and comparatively long; head in front up to the vertex longitudinally striate, the vertex and posterior portion of the head smooth, polished and shining; thorax irregularly sculptured, punctured on the sides, transversely striate on the pronotum; the metanotum above shining, but with fine punctures; pedicel and abdomen polished and shining. Head longer than broad, the occipital emargination moderately deep; mandibles smooth, shining, with a few scattered punctures; clypeus medially slightly carinate, its anterior margin transverse; antennæ comparatively long, the scape falling short of the top of the head by about one quarter of its length, antennal groove shallow and rather broad. Thorax wide anteriorly, the pronotal tubercles obtuse but distinct, the mesonotal transverse groove shallow, the ridge posterior to it rather thick; metanotal spines short, erect, acute. Pedicel: the 1st node about twice as broad as long, rounded above, without an appendix beneath; the 2nd node transversely fusiform, more than twice as broad as the 1st node; abdomen depressed, seen from above circular.

"☿. Brownish yellow, head darker, abdomen brown, mandibles,

flagellum of the antennæ and legs (excepting the femora which are brownish) reddish yellow. Very shining, the pilosity long. Head elongate, rectangular, with the posterior margin rounded, cheeks minutely longitudinally sculptured. Clypeus vaulted, its anterior margin arched. Mandibles finely denticulate. Antennal carinæ reaching up to the margin of the eyes. The scape extending beyond the top of the head, antennal joints 3–6 not longer than broad. The thorax in profile has the pro- and mesonotum arched. Pronotum smooth, laterally tuberculate. Mesonotum above with shallow punctures. Sides of the meso- and metathorax and the epinotum densely punctured, opaque. Epinotum above flat and with both sides obtusely rounded and set with an acute erect spine. Pedicel somewhat smaller, and with a less elevated node than in the ♃. The post-pedicel transversely oval, about as broad as the pedicel." (*Emery.*)

Length, ♃ 3·5; ☿ 1·8 mm.

Hab. Ceylon, Bandarawella (*Horn*); Burma, Pegu Yoma (*Allan*).

The Burmese specimen, a ♃, which I have identified as this species, is somewhat lighter in colour and with the thorax more slightly sculptured.

279. **Phidole capellinii**, *Emery, Ann. Mus. Civ. Gen.* xxv (1887), p. 463, footnote ♃. pl. 1, fig. 14; *Forel* (*var.* asperata, *Em.*), *Rev. Suisse Zool.* x (1902), p. 175, ♃; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 531 & 543.

♃. Chestnut-red, the antennæ and legs a shade lighter in colour, abdomen brown, shading into black at the apex; pilosity exceedingly sparse, consisting of only a few scattered hairs; pubescence absent. Head large, elongate, much longer than broad, feebly striate in front, reticulate on the rounded posterior lateral lobes; the front below the vertex and the clypeus remarkably flat, forming a plane, vertex itself with a shallow but distinct and broad transverse impression; sides of the head very slightly convex, more or less parallel, the occipital emargination deep, the posterior lateral lobes large and not divergent; mandibles massive, broad, shining, striate at base; clypeus anteriorly slightly emarginate in the middle, the portion between the antennal carinæ posteriorly distinctly limited; antennal carinæ slightly arched outwards, widely divergent and long, the antennal grooves well-marked, rugulose within. Thorax: the pronotum long, attenuate in front, the lateral tubercles very prominent, the mesonotal transverse groove shallow, the transverse ridge well-marked; basal portion of metanotum slightly oblique, depressed, the metanotal spines short and rather obtuse at apex. Pedicel: the nodes broader than long, transverse; abdomen broadly oval.

☿. Somewhat lighter in colour than the ♃. Head oval, with a distinct posterior border, very slightly but perceptibly emarginate; front of the head and clypeus scarcely flattened as in the ♃, not forming a marked plane; antennæ stout and long, the scape

extending beyond the top of the head by about one-fourth of its length. Thorax with the lateral tubercles on the pronotum very prominent as in the ♃; the metanotal spines stout, pointing upwards. Pedicel: the 1st node somewhat higher than the 2nd, flat above, concave, and with rather a long petiole anteriorly; abdomen oval. Head, thorax and pedicel finely but closely rugulose opaque; abdomen smooth and shining.

Length, ♃ 5·5–5·7; ☿ 2·5–3 mm.

Hab. Tenasserim at high elevations (*Fea*); extending to Java.

The above is the description of the types of var. *asperata*, Emery, which is the form of *P. capellinii* found in Burma. I owe the loan of these types to the kindness of Dr. Gestro, of the Genoa Museum.

280. **Phidole wroughtoni**, *Forel, Rev. Suisse Zool.* x (1902), pp. 176 & 193, ♃ ☿ ♀ ♂; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 531 & 543.

♃. Head, thorax, pedicel and the extreme base of the abdomen chestnut-red, the rest of the abdomen, the mandibles and clypeus anteriorly very dark brown or black. Head, thorax and abdomen covered abundantly with rather long, soft, erect hairs. Head proportionately very large, anteriorly longitudinally and somewhat coarsely, and posteriorly on the lateral lobes transversely striate, rectangular, longer than broad; mandibles punctate; clypeus anteriorly medially slightly emarginate; antennal carinæ short, divergent posteriorly; no antennal groove; the scape of the antennæ short, not reaching quite half the distance between their insertion and the top of the head. Thorax transversely striate, anteriorly rounded and convex, with no prominent lateral tubercles; mesonotum with a transverse groove and, posterior to it, a transverse distinct ridge; metanotum broad, the basal portion level, at the extreme base transversely striate, posteriorly smooth; the metanotal spines short, stout, erect and acute. Pedicel with the 1st node emarginate above, bearing no appendix beneath; 2nd node transverse, transversely striate above, twice as long as broad, convex, the lateral angles produced; abdomen broadly oval, almost circular, with an abundant piligerous punctation, opaque.

☿. Chestnut-brown, the thorax darker, covered with a fairly abundant pilosity, shining, the thorax slightly transversely striate. Head without the mandibles rectangular; the antennæ long, the scape extending beyond the top of the head by about one-fourth of its length, the apical three joints or club of the flagellum very massive. Thorax: the pronotum convex, without lateral tubercles, the transverse groove on the mesonotum shallow, the meso-metanotal suture very distinct, the metanotum rather long, subdentate posteriorly. Pedicel: the 1st node viewed from the side conical, its upper margin transverse; 2nd node rounded and convex, above longer than broad; abdomen broadly oval.

♀. Chestnut-red, the colour deepening to dark brown towards

the posterior half of the abdomen. Pilosity as in the ♃. Head very short and broad, much broader posteriorly than in front. Head and thorax longitudinally finely striate; metanotal spines subtriangular, very broad at base; anterior node of pedicel very slightly emarginate above, posterior node transverse laterally, angularly produced, more than twice as broad as long, convex and transversely striate above; abdomen elongate, convex above. Wings lacteous, sub-hyaline, with a yellowish tint and with the nervures and stigma yellow.

♂. Brown, the antennæ and legs yellowish. Head very convex posteriorly behind the eyes; mandibles with two teeth; the scape of the antennæ about as long as the basal two joints of the flagellum. Smooth and shining, the mesonotum only longitudinally striate.

Length, ♃ 5·5–6; ☿ 2·5–3·5; ♀ 7–7·5; ♂ 4·5 mm.

Hab. Recorded so far only from Western India (*Wroughton*).

281. **Phidole constanciæ**, *Forel, Rev. Suisse Zool.* x (1902), pp. 176 & 194, ♃ ☿ ♀; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 532 & 543.

♃. Head and thorax chestnut-red, antennæ, legs and abdomen yellowish brown. Pilosity as in *P. wroughtoni*, but more sparse. Head without the mandibles slightly broader than long, the occipital emargination wide and shallow, anteriorly somewhat coarsely longitudinally striate, the striæ running into reticulations posteriorly on the lateral lobes; mandibles smooth and shining, with a few shallow punctures; clypeus with the anterior margin transverse, very slightly medially incised; antennal carinæ short, widely divergent, no antennal groove; scape of the antennæ falling short of the top of the head by about half its length. Thorax: the pronotum somewhat coarsely sculptured, the lateral tubercles not distinct; the transverse groove and ridge on the mesonotum not so strongly marked as in *P. wroughtoni*; metanotum depressed, with rather smaller lateral spines than in the above species. Pedicel with 1st node in profile cuneate, its upper margin transverse, and with no appendix beneath; 2nd node from above smooth, convex, about twice as broad as long, the lateral angles not much produced; abdomen almost circular as in *P. wroughtoni*.

☿. Brownish yellow, shaded on the head, thorax and abdomen with brownish red above. Head, without the mandibles, only a little longer than broad, with the top of the head seen from the front more or less transverse; antennæ long, extending by about half their length beyond the top of the head. Thorax: the pronotum elongate, convex, the transverse groove and ridge on the mesonotum distinct; the metanotum broad, with the lateral spines very short and erect. Pedicel: the 1st node somewhat conical, obtusely transverse above; 2nd node globose, a little longer than broad, laterally not produced; abdomen elongate, oval.

♀. Resembles the ♃, but the head is proportionately broader

posteriorly, the mesonotum densely longitudinally striate, the metanotal spines are longer and more slender than in *P. wroughtoni*; 2nd node of the pedicel very broad and transversely sculptured, opaque.

Length, ♃ 4·5–5; ☿ 2·5–3; ♀ 8 mm.

Hab. Recorded so far only from the Nilgiris (*Wroughton*). Specimens, also from the Nilgiris, very much darker, almost black, have been separated as var. *nigra* by Dr. Forel.

282. **Phidole rugosa**, *Smith, Cat.* vi (1858) p. 175; *Forel, Rev. Suisse Zool.* x (1902), pp. 177 & 194, ♃; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 532 & 544.

♃. Head, thorax and pedicel castaneous red; abdomen dark brown, nearly black, with the apical margins of the segments reddish yellow; pilosity pale yellowish, short but abundant. Head, thorax and abdomen dull and opaque, the front of the head anteriorly and the metanotum coarsely striate, the striæ on the head posteriorly breaking into coarse reticulations; thorax more finely punctured and reticulate, abdomen finely and somewhat slightly longitudinally striate. Head and abdomen exceedingly large, globose, the former constricted in front, very wide posteriorly, the occipital emargination proportionately shallow and slight, the lateral lobes very large, rounded and convex above; mandibles smooth, sparsely finely punctured; clypeus medially emarginate, and with a medial vertical short and somewhat thick carina; antennæ very short; the scape, flattened and laterally margined on the upper side, falls short of the top of the head by about its own length, antennal grooves divergent, rather narrow and shallow. Thorax narrow in proportion to the very large and massive head and abdomen; pronotum and mesonotum rounded, convex, the transverse groove and ridge on the latter very slight; metanotum cubical, the basal portion flat, margined on the sides and broadening posteriorly; the metanotal spines comparatively short, erect and acute. Pedicel: the 1st node squamiform, deeply emarginate above, almost bidentate, beneath with a translucid laminate and rounded lobe; 2nd node much wider than the 1st, transversely fusiform and coarsely reticulate-punctate above; abdomen massive, very convex, above as broad as long, and as long as the thorax and pedicel united.

☿. Shining yellowish brown all over; pilosity sparse, smooth except on the meso- and metanotum, which are somewhat closely and delicately punctured. Head broadly oval, eyes prominent, occiput rounded and convex; mandibles with the basal half flat and narrow, suddenly broadening towards the masticatory margin; antennæ long, comparatively slender, the scape passing beyond the top of the head by nearly half its length. Thorax elongate, the pronotum raised and convex; the meso- and metanotum oblique, the transverse furrow on the former wide, nearly obsolete, the metanotum unarmed. Pedicel moderately long; the 1st node

squamiform, with a distinct upper margin; 2nd node globose; abdomen oval.

Length, ♃ 7·5–8; ☿ 2·5–3 mm.

Hab. Recorded so far only from Ceylon (*Yerbury & Green*).

The great difference in size between the ♃ and ☿ of this species recalls the species of *Phidologiton.*

283. **Phidole rhombinoda**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), pp. 675 & 678, ♃; *Forel, Rev. Suisse Zool.* x (1902), pp. 178 & 195, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 533 & 544.

♃. Very dark brown, shining, the head anteriorly and the mandibles, sides of the thorax and of the pedicel chestnut-red, scape of the antennæ and the legs brownish yellow. Head, thorax and abdomen covered with scattered erect pale reddish hairs. Head rectangular, as broad posteriorly as in front and a little longer than broad, somewhat coarsely longitudinally striate, the striæ running into reticulations on the apex of the lateral lobes; mandibles smooth, with some slight scattered punctures; clypeus emarginate in the middle, with a smooth shining medial portion above the emargination; antennal carinæ short, divergent; antennal groove broad and shallow, punctured within; scape of the antennæ falling short of the top of the head by about half its length. Thorax transversely sculptured and striate, the pronotum convex anteriorly, laterally obtusely tuberculate, the transverse mesonotal ridge and meso-metanotal suture very deep and distinct; basal portion of the metanotum smooth and shining, metanotal spines short, stout, acute and erect. Pedicel broad in front of the 1st node and laterally subdentate; 1st node transverse, not emarginate above, with no appendix beneath; 2nd node about three times as broad as the 1st node, anteriorly convex, transversely striate, posteriorly slightly constricted, and paler in colour; abdomen from above broadly oval, nearly circular, obscurely striate at base.

☿. Head, thorax and pedicel light castaneous brown, antennæ and legs a paler shade of the same, abdomen very dark brown, almost black; head, thorax and abdomen highly polished and shining, the sides of the thorax and posteriorly, the basal portion of the metanotum delicately rugulose; pilosity as in the ♃. Head oval; antennæ long, the scape extending beyond the top of the head by fully one-third of its length from insertion; eyes lateral, remarkably large, and placed about the middle of the head. Thorax: the pronotum laterally tuberculate, the transverse ridge and the meso-metanotal suture very deep and distinct as in the ♃; metanotum laterally bidentate. Pedicel as in the ♃; the 2nd node only proportionately somewhat bell-shaped; abdomen broadly oval.

♀. Light reddish brown, the posterior margins of the abdominal segments narrowly testaceous. Head, pro-, meso- and metanotum and base of abdomen longitudinally striate, the scutellum and

posterior node of the pedicel transversely sculptured. Pilosity similar to that in the ♃ but more sparse. Head very short, without the mandibles much broader than long, particularly broad posteriorly, and very broadly but not deeply emarginate. Thorax : the mesonotum flat above, very gibbous in front, the pronotum well-depressed beneath it, the metanotal spines short and stout ; the anterior node of the pedicel almost laminate with a sharp margin, and broader above than at base ; posterior node and abdomen proportionately as in the ♃. Wings subhyaline, nervures pale yellow.

Length, ♃ 4·5–5 ; ☿ 3; ♀ 6 mm.

Hab. Throughout Continental India and Ceylon.

Var. *taprobanæ*, Forel, differs in having the head slightly larger and more deeply emarginate. Var. *micantiventris*, Mayr (*apud Forel*), has "the abdomen entirely opaque, finely striate-reticulate."

284. **Phidole horni**, *Emery, Deutsch. ent. Zeit.* 1901, p. 118, ♃ ; *Forel, Rev. Suisse Zool.* x (1902), p. 183, ♃ ; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 537 & 546.

♃. Allied to and very closely resembling *P. rhombinoda*, Mayr. Differs in being slightly larger and in having the head longer, narrower anteriorly, with the occipital emargination not so shallow. Head, thorax and abdomen bright reddish brown, the last darkening posteriorly, with the apical margins of the segments yellowish, the antennæ and legs paler in colour. Pilosity, sculpture of the head, and sculpture and form of the thorax as in *P. rhombinoda*. Pedicel proportionately shorter, the 2nd node about as long and about three times as broad as the 1st node. Metanotal spines longer and more slender. For the rest as in *P. rhombinoda*.

Length, ♃ 5 mm.

Hab. Ceylon (*Horn & Green*).

Dr. Emery received this species from Bentota. I am not quite certain whether the solitary specimen of a ♃ described above without any ☿ or ♀ accompanying it, collected by Mr. E. E. Green at Peradeniya, near Kandy, has been correctly identified.

285. **Phidole sulcaticeps**, *Roger, Berl. ent. Zeit.* vii (1863), p. 193, ♃; *Forel, Rev. Suisse Zool.* x (1902), pp. 178 & 195, ♃ ☿ ; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 533 & 544.

♃. Reddish brown, shining, the head and abdomen darker than the thorax, the antennæ and legs brownish yellow. Pilosity reddish, abundant. Head rectangular, as broad posteriorly as in front, and longer than broad, longitudinally striate, the striæ curving laterally outwards and becoming transverse on the posterior lobes, a distinct somewhat transverse depression on the vertex; mandibles smooth and shining, sparsely punctured ; clypeus smooth and slightly depressed in the middle, its anterior margin medially incised ; antennal carinæ short and rather prominent, antennal groove very marked, sculptured within and slightly widening at

apex; scape of the antennæ not reaching quite half way from their insertion to the top of the head. Thorax transversely striate, anteriorly convex, the mesonotal transverse groove and ridge very distinct; the metanotum flat above, depressed, the metanotal spines short, erect, acute. Pedicel: the 1st node somewhat squamiform, above transverse, not emarginate, no appendix beneath; 2nd node transverse, rounded above, laterally cone-shaped, punctured, opaque; abdomen broadly oval, shining, punctured at base, the 2nd and succeeding segments highly polished.

☿. Resembles the ♃ in colour and pilosity, very smooth and shining, the sides of the thorax indistinctly sculptured, the base of the abdomen slightly punctured. Head broadly oval, very convex in front; antennæ stout, the scape extending for about one-third of its length beyond the top of the head. Thorax proportionately broad and very convex anteriorly, the transverse mesonotal groove shallow, the basal portion of the metanotum long and flat, the metanotal spines short and acute. Pedicel elongate, from above the 2nd node circular, convex above; abdomen oval, attenuate at base.

Length, ♃ 4·5–5; ☿ 2·5 mm.

Hab. Bengal (*Taylor*), the North-west Provinces (*Smythies*), and Western India (*Heim*).

Var. *punensis*, Forel, is lighter in colour, with the transverse mesonotal groove deeper and the 1st node of the pedicel emarginate above.

286. **Phidole yeensis**, *Forel.*

Pheidole sulcaticeps, *Roger*, *race* yeensis, *Forel*, *Rev. Suisse Zool.* x (1902), p. 179; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 533 & 544.

♃. Very dark brown, shining, the flagellum of the antennæ and legs lighter brown; pilosity yellowish red, fairly abundant. Head longer than broad, very distinctly constricted posteriorly, with the occipital medial emargination very deep, the lateral lobes very prominent and a deep and well-marked transverse impression on the vertex, the lateral lobes above the impression being inclined slightly forward; mandibles smooth, shining, indistinctly striate and punctured at base; clypeus vertically striate, its anterior border medially emarginate; antennæ opaque, pubescent, the scape reaching a little more than half way from insertion to the top of the head; antennal carinæ short, divergent, antennal hollows well-marked, broadening posteriorly and reticulate within; the front and cheeks coarsely, regularly, longitudinally, the occipital lobes transversely striate. Thorax transversely striate, the pronotal tubercles not well-marked, the transverse mesonotal furrow shallow, the ridge posterior to it slight; the basal portion of the metanotum flat, short and laterally margined, the spines stout, erect and acute. Pedicel comparatively short, transversely striate; the 1st node squamiform, without an appendix beneath; 2nd node twice

as broad as long, the sides cone-shaped; abdomen somewhat depressed and coarsely longitudinally striate from end to end.

☿. Dark castaneous brown, shining, pilosity as in the ♃; head oval, smooth, very broad across the eyes, the occiput rounded; antennæ long, the scape extending beyond the top of the head. Thorax elongate, broad anteriorly, pronotal tubercles absent, transverse mesonotal furrow shallow; metanotal spines short, erect, acute, basal portion longer than the apical portion, the latter oblique; the meso- and metanotum closely punctured, striate on the sides. Pedicel smooth, with the 1st node seen from above rectangular, raised posteriorly; the 2nd node twice as broad, rounded above; abdomen dull and opaque, striate in certain lights.

Length, ♃ 6–6·3; ☿ 2·75–3 mm.

Hab. Throughout the hills of Burma and Tenasserim (*Bingham*).

287. **Phidole striativentris**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 678, ♃; *Forel, Rev. Suisse Zool.* x (1902), pp. 179 & 195, ♃ ☿ ♀; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 534 & 544.

♃. Head and thorax chestnut-red; abdomen brown posteriorly, chestnut-red at base; head, thorax and abdomen covered with a soft, rather long, red pilosity, most dense on the abdomen. Head rectangular, the sides rather convex, longitudinally and somewhat coarsely striate, transversely on the front of the lateral lobes, breaking into reticulations on the apex; vertex with a very distinct transverse depression, the occipital emargination deep; mandibles smooth, punctured; clypeus with a depressed medial portion, which is obliquely striate; antennal carinæ very short; antennal grooves shallow but distinct, finely and delicately sculptured within; scape of the antennæ extending for a little more than half the distance from its insertion to the top of the head. Thorax rather short, transversely striate; pronotum convex in front, only very slightly laterally tuberculate; mesonotum sloping obliquely back, the transverse groove shallow; metanotum short, broad, the basal and apical portions subequal, the metanotal spines comparatively large and acute. Pedicel short: the 1st node cuneate, transverse above, without any appendix beneath; 2nd node punctured, twice as broad as long, laterally cone-shaped; abdomen anteriorly finely and closely striate, in certain lights reticulate and opaque, posteriorly shining.

☿. Light brown, smooth and shining; antennæ and legs yellowish brown; abdomen sometimes with the base yellowish brown and the apical two-thirds very dark brown. Head oval with a distinct posterior margin; scape of the antennæ extending only about one-fourth of its length beyond the top of the head. Thorax in profile slightly bi-emarginate; the pronotum laterally tuberculate, the basal portion of the metanotum long, laterally bidentate. Pedicel: the 1st node comparatively small, its upper

margin entire; the 2nd node broader than long, sculptured; abdomen punctured at base.

♀. Similar to the ♃ but darker in colour. Pilosity as in the ♃. Head without the mandibles somewhat square, the occiput transverse not emarginate, slightly narrower than the thorax; head, mesonotum and base of abdomen longitudinally striate; the scutellum shining and smooth; the metanotum and nodes of the pedicel transversely striate, metanotal spines stout and acute; apical two-thirds of the abdomen somewhat densely pilose with piligerous tubercles.

Length, ♃ 4–4·5; ☿ 2–2·5; ♀ 6 mm.

Hab. Generally spread throughout Continental India.

288. **Phidole ghatica**, *Forel, Rev. Suisse Zool.* x (1902), pp. 180 & 196, ♃ ☿; *id. Jour. Bomb. N. H.* xiv (1902), pp. 534 & 545.

♃. Reddish brown; abdomen dark brown, mandibles, antennæ and legs yellowish brown. Head, thorax and abdomen covered rather sparsely with erect pale hairs. Head without the mandibles rectangular, a little longer than broad, regularly somewhat finely longitudinally striate, the occipital emargination V-shaped, somewhat deep, little or no depression on the vertex; mandibles shining, rather closely punctured; clypeus with a shining medial portion, delicately longitudinally striate, with its anterior margin incised; antennal carinæ short, posteriorly divergent; antennal groove shallow but distinct, delicately punctured within; scape of the antennæ reaching somewhat more than half way from insertion to the top of the head. Thorax transversely striate, anteriorly convex; pronotum above laterally tuberculate, transverse groove on mesonotum wide and shallow; basal and apical portions of the metanotum subequal, metanotal spines stout and acute. Pedicel rather short; the 1st node in profile triangular, with no appendix beneath; 2nd node transversely spindle-shaped, rounded above and striate, not quite twice as broad as long; abdomen broadly oval, punctured and opaque, the bases of the 2nd and succeeding segments smooth and shining.

☿. Head and thorax deep reddish brown, mandibles, antennæ and legs yellowish brown; abdomen dark brown. Head, thorax and abdomen densely finely punctured, opaque, covered with sparsely scattered erect pale hairs. Head oval, with a distinct posterior margin; eyes large, lateral, a little below the middle line of the head; thorax laterally tuberculate, mesonotal transverse groove not very distinct; the basal portion of the metanotum a little longer than the apical, the lateral spines stout, acute, erect, Pedicel: the 1st node thick and somewhat rounded above; 2nd node broader than long, the lateral cones fairly distinct; abdomen oval.

Length, ♃ 3·5; ☿ 2·5 mm.

Hab. Recorded so far only from Western India (*Wroughton*).

289. **Phidole magretti**, *Emery, Ann. Mus. Civ. Gen.* xxv (1887), p. 462, ♃ ☿; *Forel, Rev. Suisse Zool.* x (1902), p. 180, ♃; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 534 & 545.

♃. Very dark reddish or chestnut-brown, deepening almost to black on the abdomen; flagellum of the antennæ and legs much lighter; pilosity reddish, abundant, rather long; pubescence wanting except on the flagellum of the antennæ and the tarsi. Head rectangular, much longer than broad, the sides parallel, the occipital emargination narrow and not very deep, the posterior lateral lobes not prominent nor divergent; mandibles smooth, shining, highly polished; clypeus very well defined posteriorly, the portion between the bases of the antennæ somewhat depressed, with a central slightly raised bulb; antennal earinæ widely divergent; the antennæ short, antennal grooves broadening greatly at apex downwards towards the eyes. Head somewhat irregularly longitudinally striate, reticulate. Thorax short, irregularly transversely rugose and opaque; the pronotum proportionately somewhat massive, with the lateral tubercles prominent, mesonotal transverse groove and ridge indistinct; basal portion of mesonotum horizontal, laterally margined, metanotal spines acute. Pedicel: the nodes above rugulose, the 1st node transverse, a little broader than long, 2nd node transversely shuttle-shaped, the lateral angles cone-shaped; abdomen smooth, polished, shining, broadly oval.

Length, ♃ 3·5–4 mm.

Hab. Karennee (*Fea*).

290. **Phidole sepulchralis**, sp. nov.

♃. Very dark brown, almost black; the antennæ and legs reddish; pilosity pale, very abundant and long, especially on the head in front and on the abdomen; head longitudinally finely and regularly striate, with scattered superficial large punctures; thorax smooth, highly polished and shining, only the sides and the metanotum obscurely rugulose; pedicel and abdomen very highly polished, smooth and shining. Head longer than broad, the cheeks straight to above the eyes, then curved inwards, convex, occipital emargination deep but not wide, the posterior lateral lobes long, not divergent; eyes below the middle line of the head; mandibles finely but sparsely punctured, the masticatory margin not dentate; clypeus narrow, anteriorly transverse, not emarginate; the medial portion between the bases of the antennæ smooth, convex, defined posteriorly by a curved, very distinct, but narrow groove or impressed line; antennal carinæ long, divergent, the antennal grooves shallow, finely rugulose within; antennæ somewhat short and slender, the scape barely extending two-thirds of the distance between its insertion and the top of the head, the antennal groove is longer than the scape, and broadens a little posteriorly. Thorax: the pronotum with pronounced but obtuse lateral tubercles, mesonotal transverse groove and ridge slight; basal portion of metanotum short, broadening posteriorly and with a broad deep

longitudinal groove; metanotal spines long, suberect, curved and acute. Pedicel: the 1st node transverse above, emarginate and subdentate, without appendix beneath; 2nd node rounded above, transversely oval, the lateral angles produced and acute; abdomen very broadly oval.

Length, ♃ 4·5–5 mm.

Hab. Upper Burma, the Chin Hills.

A few specimens, all ♃ ♃, of this very distinct species were sent to me by post, alive, in a joint of bamboo, by some unknown correspondent. There was a pencil note with them to the effect that they were taken crawling over a grave in a Chin village.

291. **Phidole jucunda**, *Forel, J. A. S. B.* liv, pt. 2 (1885), p. 179, ♃; *id. Rev. Suisse Zool.* x (1902), pp. 180 & 196, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 535 & 545.

♃. Brownish cinnamon-red, the abdomen brown; head coarsely longitudinally striate; thorax rather finely but obscurely transversely sculptured; abdomen smooth, but dull and subopaque. Pilosity very sparse, reduced to a few scattered hairs. Head nearly square, the occipital emargination moderately deep and wide; mandibles minutely obscurely striate, with also a few distinct punctures; clypeus with a triangular medial depression bearing a medial vertical carina; antennæ comparatively long, the apex of the scape falling short of the top of the head by about a third of its length; antennal groove deep and coarsely sculptured within. Thorax: the pronotum convex, rather elongate anteriorly, the lateral tubercles very obtuse and indistinct, mesonotal transverse groove and ridge well-marked; basal portion of metanotum rectangular, laterally margined; metanotal spines short, stout, acute. Pedicel: the 1st node squamiform, low, transverse above, with no appendix beneath; the 2nd node transverse, sculptured, opaque, laterally obtusely cone-shaped; abdomen broadly oval.

☿. Dark cinnamon-red, the abdomen dark brown. Head and thorax finely, closely reticulate-punctate, subopaque, abdomen somewhat smooth and shining. Head oval, the antennæ pubescent, stout and long, the scape extending by about one-third of its length beyond the top of the head. Thorax elongate, the transverse mesonotal furrow and ridge well-marked, the former deep and wide; metanotal spines comparatively short, but stout and very acute. Pedicel: the 1st node small, the 2nd node much larger, rhombiform and rounded; abdomen opaque at base, smooth posteriorly.

Length, ♃ 4–4·5; ☿ 2–2·5 mm.

Hab. Sikhim (*Möller*); Calcutta (*Rothney*); Western India (*Wroughton*); Ceylon (*Bingham*). The Ceylon form is paler with the head a little longer and narrower, and the 2nd node of the pedicel not so broad, but otherwise it does not seem to me to differ from the typical form.

292. **Phidole fossulata**, *Forel.*

Pheidole jucunda, *race* fossulata, *Forel, Rev. Suisse Zool.* x (1902), pp. 181 & 196, ♃ ☿.

♃. Closely resembles *P. jucunda*, Forel, but is of a browner colour, the head is longer than broad, the occipital emargination deeper, the occipital lateral lobes more obtuse, and the vertex bears a distinct but slight transverse impression. Thorax as in *P. jucunda*. Pedicel with the lateral cone-shaped ends of the 2nd node more distinct; abdomen closely and finely reticulate and opaque at base and studded with large oblong piligerous punctures.

☿. Differs from the ☿ of *P. jucunda* in the coarser denser sculpture, the head is slightly longitudinally and the thorax transversely striate and opaque. Head subrectangular, with the posterior margin rounded, not distinct; the antennæ longer than in *P. jucunda* ☿, the scape extends beyond the top of the head by about half its length. The rest as in *P. jucunda* ☿.

Length, ♃ 4·5–5; ☿ nearly 3 mm.

Hab. Western India (*Wroughton*); Sikhim (*Bingham*). This species, unlike *P. jucunda* which I found only in the hot valleys, extends in Sikhim up to 7000 feet.

293. **Phidole multidens**, *Forel, Rev. Suisse Zool.* x (1902), pp. 181 & 197, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 535 & 545.

♃. Sordid yellow, the abdomen posteriorly shading to brownish, the head darker than the thorax; head very lightly longitudinally striate; pronotum and abdomen smooth and shining, mesonotum, metanotum and the pedicel finely punctured and reticulate; pilosity pale, abundant, soft and moderately long. Head without mandibles rectangular, very slightly broader posteriorly than in front; mandibles smooth, shining, faintly obliquely striate on the outer margin; clypeus triangular in the middle, medially strongly carinate; antennæ slender, the scape falling short of the top of the head by about one-fourth of its length; the antennal groove very shallow, finely reticulate within; occipital emargination somewhat shallow. Thorax: the pronotum with subdentiform lateral tubercles; mesonotum posteriorly to the lateral tubercles indistinctly formed into two very small teeth, the mesonotal transverse groove and ridge not well-marked; basal portion of metanotum rather broad, margined along the sides and armed posteriorly with two small, erect, acute teeth. Pedicel: the 1st node above with the lateral angles acutely produced upwards, the petiole in front decreasing in thickness to the base; 2nd node slightly convex above, transverse, anteriorly rounded, the anterior lateral angles produced into little cones; abdomen very broadly oval.

☿. Yellow; head with a slight brownish tint, shining but covered, as is the thorax and abdomen, with fairly abundant, long, erect, pale hairs. Head oval, elongate, convex in front; eyes lateral, placed about the middle of the head; antennæ long, the scape extending

well beyond the top of the head. Thorax elongate, somewhat narrow; the pro-mesonotum with two lateral short erect teeth; basal portion of metanotum long, slightly sloping posteriorly, dentate. Pedicel elongate; the 1st node squamiform, entire, with no appendix beneath; 2nd node globose, twice as large as the 1st; abdomen oval.

Length, ♃ 3·5; ☿ 2·5 mm.

Hab. Western India, Poona (*Wroughton*).

294. **Phidole rogersi**, *Forel, Rev. Suisse Zool.* x (1902), pp. 181 & 197, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 535 & 545.

♃. Reddish yellow, abdomen brownish posteriorly, the antennæ and legs yellow; head finely and lightly longitudinally striate, posteriorly and on the occiput smooth, slightly punctured; thorax anteriorly and the abdomen smooth and shining, the sides of the mesonotum and metanotum and the nodes of the pedicel finely rugulose; pilosity pale yellow, moderate, most abundant on the front of the head and on the abdomen posteriorly above, rather sparse but very distinct on the tibiæ of the legs. Head longer than broad, the sides parallel, the occipital emargination moderately deep, the frontal groove well-marked and deep; mandibles finely but obscurely longitudinally striate; antennæ slender, the scape falling short of the top of the head by about one-third of its own length. Thorax short, the pronotal tubercles distinct but not prominent, the mesonotal transverse groove and ridge nearly obsolete; basal portion of metanotum medially longitudinally grooved, the spines short and erect. Pedicel: the 1st node squamiform, entire, with no appendix beneath; 2nd node globose, slightly transverse; abdomen elongate oval.

"☿. Head ovate-rectangular, posterior margin well-defined. Scape extending by one-third of its own length beyond the occiput. The pronotum with 2 subdentiform tubercles. Mesonotum very slightly impressed in the middle. Two small metanotal spines. Second node of the pedicel small, somewhat square, with the angles obtuse. Thorax partly reticulate, cheeks striate, the rest smooth. Hairs on the tibiæ a little oblique. Reddish yellow, head and abdomen yellowish brown (in part brownish yellow)." (*Forel.*)

Length, ♃ 3; ☿ 1·7–2·3 mm.

Hab. North-West Provinces, the Siwaliks (*Rogers*); Bengal (*Taylor*). The Bengal form has been separated by Dr. Forel as var. *taylori*: it differs from the type in being smaller, narrower, and has the scape of the antennæ thicker.

295. **Phidole peguensis**, *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 468, ♃ ☿; *Forel, Rev. Suisse Zool.* x (1902), p. 182, ♃; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 536 & 545.

♃. Head and thorax brownish red, pedicel and abdomen dusky greenish brown, antennæ and legs brownish yellow. Head, thorax and abdomen covered with abundant, rather long, soft,

erect red hairs. Head longitudinally striate, the striæ running into reticulations on the vertex and posterior lateral lobes; no transverse depression on the vertex, but a medial deeply impressed line from the bottom of the occipital emargination; mandibles smooth, shining, sparsely punctured; clypeus with the anterior margin medially bidentate; antennal carinæ divergent, antennal grooves distinct, broadening at the top and delicately sculptured within; scape about half the length of the distance between its insertion and the top of the head. Thorax transversely striate; the pronotum convex anteriorly, the lateral tubercles distinct, obtuse; transverse mesonotal groove and ridge not so distinctly marked as in some other species (e. g. *P. spathifera*, *striativentris*, &c.); metanotum short, the lateral spines long and acute. Pedicel: the 1st node cuneiform, its upper margin transverse, entire, without an appendix beneath; the 2nd node transversely striate, about twice as broad as long, laterally obtusely cone-shaped; abdomen broadly oval, shining, covered with piligerous tubercles.

Length, ♃ 5·5–6·5 mm.

Hab. Burma: Rangoon district (*Fea*); Pegu Yoma (*Bingham*).

296. **Phidole roberti**, *Forel, Rev. Suisse Zool.* x (1902), pp. 182 & 198, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 536 & 545.

♃. Bright light red; the antennæ, legs and abdomen brownish or reddish yellow; pilosity rather sparse and scattered, of a bright yellowish red; head longitudinally, rather finely, and not deeply striate, the striæ breaking into reticulations posteriorly; thorax finely transversely striate, finely punctured on the sides; pedicel slightly sculptured; abdomen smooth and shining. Head longer than broad, very slightly constricted towards the occiput, the sides convex; mandibles smooth, polished and very shining; clypeus advanced slightly in the middle and emarginate; antennæ short, the scape falling short of the top of the head by two-thirds of its length. Thorax anteriorly gibbous; the pronotum without lateral tubercles; mesonotum slightly constricted, the transverse groove and ridge well-marked; metanotum narrow, the metanotal spines very long and acute. Pedicel somewhat elongate, the 1st node squamiform, the 2nd node from above transversely oval, slightly fusiform; abdomen oval.

"☿. Head ovato-rectangular, with only a slightly distinct posterior margin. The scape extends beyond the occiput by two-thirds of its length. The pronotum forms a strong regular convexity. Mesonotal furrow deep, behind which the mesonotum is raised and convex, without forming a transverse ridge. Metanotum with two small teeth. Second node rounded. Smooth and shining; sides of the thorax reticulate and subopaque. Pilosity of the tibiæ short and a little oblique. Of a yellowish red. Abdomen yellowish."

Length, ♃ 4·5–5; ☿ 2·4–2·6 mm.

Hab. Sikhim (*Möller*); Kanara (*Wroughton*).

297. **Phidole feæ**, *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 469, ♃ ☿ ♀: *Forel, Rev. Suisse Zool.* x (1902), p. 183, ♃; *id. Jour. Bomb. N. H. Soc.* xiv (1902), p. 536.

♃. Of a light yellowish red all over; the flagellum of the antennæ, the legs and abdomen more yellowish, the last with a slight brownish tint; pilosity pale reddish yellow, abundant; pubescence wanting except on the flagellum of the antennæ and the tarsi, where, in certain lights, it appears dense but very short and minute. Head rectangular, broader posteriorly than in front, somewhat coarsely longitudinally striate, the striæ breaking into reticulations on the prominent, rather acute and divergent lateral lobes; mandibles massive, sparsely punctured, masticatory margin obsoletely dentate; clypeus medially smooth, anteriorly emarginate in the middle; antennal carinæ long, divergent posteriorly; antennal grooves beneath them shallow, as coarsely sculptured as the rest of the head; antennæ slender, short, the scape reaching only about two-thirds of the distance between their insertion and the apex of the lateral lobes of the head; eyes small, lateral, placed well below the middle of the head. Thorax short, transversely rugose, the pronotum rounded, the lateral tubercles not at all prominent, the mesonotal transverse groove broad and shallow; basal portion of metanotum longer than broad, with a shallow longitudinal medial groove; metanotal spines short, acute, erect. Pedicel short; the 1st node squamiform, transverse, petiolate in front, the petiole laterally dentate; 2nd node transverse, laterally cone-shaped; abdomen convex, smooth and shining, broader in front than posteriorly.

☿. Reddish yellow, head and abdomen with a brownish tint. Head smooth and shining, broadly oval, rounded, not transverse posteriorly; eyes very prominent; mandibles comparatively long, dentate; antennæ long and slender, the scape passing by nearly half its length beyond the top of the head. Thorax short, anteriorly smooth and shining; the metanotum minutely and closely punctured, opaque; metanotal spines short, erect and acute. Pedicel: the 1st node transverse, the 2nd node rather long, globose; abdomen smooth and shining, broadly oval.

? ♀. Dark brown, much darker than the ♃, the mandibles, antennæ and legs reddish brown; the abdomen posteriorly yellowish. Head coarsely longitudinally striate, short, much broader than long, not at all or only very slightly emarginate posteriorly; antennæ very long, the scape passing a little beyond the top of the head. Thorax massive; the mesonotum flat, somewhat irregularly and finely longitudinally striate, reticulate; metanotal spines thick, triangular. Pedicel short, the nodes transversely striate; abdomen smooth and shining.

Length, ♃ 3·5–3·75; ☿ 2·5; ♀ 4·5 mm.

Hab. Tenasserim, Karennee (*Fea*).

298. **Phidole binghami**, *Forel, Rev. Suisse Zool.* x (1902), pp. 183 & 198, ♃ ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 537 & 546.

♃. Dull castaneous red, legs brownish yellow, abdomen brown. Some specimens are brighter in colour, with the abdomen brown only in the middle above, and the legs reddish yellow. Pilosity very sparse; head longitudinally striate in front, reticulate posteriorly on the lateral lobes; thorax transversely irregularly sculptured, the metanotum striate on the basal portion; nodes of pedicel punctured, opaque; abdomen smooth and shining. Head oval, the cheeks convex, the occipital emargination narrow; mandibles proportionately rather large, punctured; clypeus slightly emarginate anteriorly; antennæ slender, the scape falling short of the top of the head by about one-third of its length; antennal furrow broad but shallow. Thorax anteriorly gibbous, the lateral tubercles barely indicated; the transverse mesonotal furrow broad and shallow, the carina posterior to it thick, the basal portion of the metanotum flat and rectangular; metanotal spines pointing slightly obliquely backwards. Pedicel: the 1st node somewhat conical, but with a distinct transverse upper margin and without any appendix beneath; 2nd node short, transversely fusiform, much broader than long; abdomen oval.

☿. Yellowish red, the abdomen brownish, the legs paler in colour than the head and thorax; head oval; antennæ elongate, the scape passing beyond the top of the head by nearly one-third of its length. Thorax: the pronotum slightly bituberculate, the mesonotal furrow distinct, and a wide transverse ridge behind it; metanotum elongate, bidentate. Pedicel: the 2nd node not quite twice as broad as the 1st; abdomen oval.

Length, ♃ 3·5–4; ☿ 2·5 mm.

Hab. Lower Burma, Pegu Yoma (*Allan*); Tenasserim, the Yè valley (*Bingham*).

299. **Phidole plagiaria**, *Smith, Jour. Linn. Soc.* v (1860), p. 112, ♃ ☿; *Forel, Rev. Suisse Zool.* x (1902), p. 184, ♃; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 537 & 546.

♃. Reddish brown; the antennæ, posterior portion of the thorax, legs and base of abdomen paler, the last somewhat yellowish, the abdomen posteriorly dark brown; pilosity pale yellow, very abundant; the flagellum of the antennæ and the tarsi of the legs minutely but densely pubescent. Head broader posteriorly than in front, somewhat coarsely longitudinally striate, the striæ curving outwards on the lateral lobes of the head, occipital emargination comparatively deep; eyes below the middle line of the head; mandibles punctured and shining; clypeus not emarginate, anteriorly depressed, smooth between the bases of the antennæ; antennal carinæ produced as fine divergent striæ throughout the length of the scape; antennal grooves finely rugulose within. Thorax: the lateral tubercles on the pronotum strongly pronounced, the transverse metanotal groove shallow and broad,

the metanotal ridge behind it barely indicated; the basal portion of the metanotum long, rectangular, finely transversely striate, and with a longitudinal shallow medial groove; metanotal spines comparatively long, acute, erect. Pedicel rather short; the 1st node flat, slightly emarginate above; the 2nd transverse, with the sides not conical above, transversely striate; abdomen broadly oval.

Length, ♃ 4·5–5 mm.

Hab. Burma, Pegu Yoma (*Allan*); Tenasserim (*Fea*).

300. **Phidole javana**, *Mayr, Tijds. v. Ent.* x (1867), p. 98, ♃ ☿; *Forel, Rev. Suisse Zool.* x (1902), p. 184; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 537 & 546.

♃. Castaneous red, antennæ, thorax, legs and pedicel more yellowish, abdomen brownish yellow; pilosity short but very abundant; head longitudinally striate, a little punctured on the posterior lateral lobes; thorax and pedicel more finely transversely rugulose; abdomen very smooth and shining. Head nearly square, but a little longer than broad; occipital emargination wide, somewhat shallow; mandibles shining, sparsely punctured; clypeus with a medial smooth shining triangular portion, the sides striate; antennal carinæ as long as the scape, divergent posteriorly; antennal grooves shallow, broadening posteriorly, finely rugulose within; antennæ moderately long, the scape reaches about three-fourths of the distance between its insertion and the top of the head; eyes lateral, well below the middle of the head. Thorax: the pronotum rounded, very convex, almost without lateral tubercles; the mesonotal transverse groove and ridge very slightly marked; the basal portion of the metanotum moderately long; the metanotal spines short, erect, acute. Pedicel short, the nodes transverse, without appendix beneath, the 2nd transversely oval, twice as broad as the 1st; abdomen broadly oval.

"☿. Shining reddish yellow, the head darker, the abdomen fuscous; pilosity abundant; mandibles finely obscurely striate towards the acutely dentate masticatory margin; head somewhat smooth, front between the frontal carinæ very finely striate, punctured and superficially reticulate-punctate, the cheeks striate; pronotum rounded, finely coriaceous and rugulose (or very superficially reticulate punctate), the disc smoother, with some transverse striæ in front; mesonotum with a medial sloping raised portion; metanotum with two triangular erect teeth; meso- and metathorax reticulate punctate; pedicel finely coriaceous and rugulose; abdomen smooth." (*Mayr*.)

Length, ♃ 3·5–4; ☿ 2·4 mm.

Hab. Burma (*Fea*, *Bingham*), extending to Java. A variety separated as var. *dharmsalana* by Dr. Forel, has been procured by Sage in the North-west Himalayas. I have seen no specimen of this latter, but it differs apparently in having the head in front broader.

301. **Phidole indica**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), pp. 676–679, ♃ ☿ ♀; *Forel, Rev. Suisse Zool.* x (1902), pp. 184, ♃, & 198, ♂; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 538 & 546.

♃. Dark castaneous brown, shining, the flagellum of the antennæ, the metathorax, legs and pedicel of a somewhat lighter shade; head, thorax and abdomen with fairly abundant pale red erect hairs, and a thin sparse minute whitish pubescence seen only in certain lights, and most distinct on the flagellum of the antennæ and the tibiæ and tarsi of the legs. Head slightly narrower posteriorly than in front; the occiput deeply emarginate, with a distinct depression on the vertex, the posterior lateral angles conical and rounded above; the whole head somewhat coarsely longitudinally striate, the striæ curving transversely outwards on the posterior lateral angles; mandibles smooth and shining, the masticatory margin with two blunt teeth at apex, the upper portion of margin indistinctly crenulate; clypeus with its medial portion smooth and shining, slightly convex; scape of the antennæ reaching a little more than halfway up from its insertion to the top of the head and fitted into a longitudinal groove. Thorax irregularly transversely striate; pronotum rounded, convex; mesonotum with a transverse ridge slightly bigibbous; metanotum longitudinally sulcate, the lateral spines short and thick at base. Anterior node of the pedicel without an appendix or prolongation beneath, posterior node slightly transverse, about twice as broad above as the anterior node; abdomen a little longer than broad.

☿. Yellowish or reddish brown, smooth and shining, head and abdomen darker; pilosity as in the ♃, pubescence almost entirely wanting; head oval, the occiput rounded; thorax anteriorly smooth and polished, a little narrower than the head; mesonotum, metanotum and node of the pedicel delicately sculptured, opaque; abdomen smooth and shining.

♀. Resembles the ♃, but is fuscous brown, with the mandibles, antennæ, sides of the thorax posteriorly and the legs reddish brown. The head is a little broader than long, sculptured as in the ♃; the mesonotum and sides of the metanotum longitudinally striate and rugose; the nodes of the pedicel transversely striate.

♂. Head smaller proportionately than in the ♀, thorax massive; scape of the antennæ short, about equal in length to the basal two joints of the flagellum. Head and thorax more or less sculptured and opaque. Dark brown; wings yellowish hyaline, nervures yellow.

Length, ♃ 4·5–5·5; ☿ 2·5; ♀ 8·5; ♂ 5 mm.

Hab. Throughout Continental India, Burma, and Ceylon.

Var. *coonoorensis*, Forel, has the sculpture on the head and especially on the occiput more pronounced, the striæ being more abundant and distinct, and the pronotum somewhat tuberculate.

302. **Phidole rotschana,** *Forel, Rev. Suisse Zool.* x (1902), pp. 185, ♃, & 199, ☿; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 538 & 546.

♃. Resembles the ♃ of *P. indica*; differs in the head, thorax and abdomen being almost uniform chestnut-red, with the antennæ and legs yellowish red. Pilosity and pubescence as in *P. indica.* The striæ on the head are wider apart and lighter, and less curved transversely outwards on the posterior lateral angles; the head itself is rectangular, as broad posteriorly as in front; the eyes larger and more prominent; the scape of the antennæ shorter, barely reaching half the distance from its insertion to the top of the head. Thorax proportionately slightly broader than in *P. indica*, the pronotum somewhat laterally tuberculate, the metanotal spines shorter. The rest as in *P. indica.*

☿. Differs from the ☿ of *P. indica* in being rather more slenderly built, with proportionately shorter antennæ and longer legs; the head is broader posteriorly; the scape of the antennæ extending beyond the top of the head by less than one-fourth of its length from insertion; the metanotal spines are distinctly shorter, and in colour the head and abdomen are darker.

Length, ♃ 3·5–4·5; ☿ 2–2·5 mm.

Hab. Western India (*Wroughton*).

303. **Phidole allani,** sp. nov.

♃. Rather bright reddish or yellowish brown, antennæ and legs reddish yellow; head somewhat coarsely longitudinally striate up to a little beyond the vertex; the occiput and lateral lobes above smooth; the pronotum of the thorax in front and the metanotum transversely striate, the sides of the thorax somewhat irregularly closely rugulose, granulate; legs, pedicel and abdomen smooth; the whole insect bright and shining; pilosity pale yellow, long and abundant, especially on the abdomen. Head remarkably thick, short and broad, as broad as long, the occipital emargination moderate and wide, the medial frontal sulcation broad and distinct; mandibles smooth and shining, not punctate; clypeus in the middle smooth and polished, its anterior margin transverse; antennal carinæ short, wide apart, divergent, continued back as striæ about the length of the scape; the antennal hollow for the latter not well-marked; antennæ of moderate length, the scape falling short of the top of the head by one-third of its own length; eyes lateral, placed low down in the lower third of the side of the head. Thorax: the pronotum somewhat flat in front, the lateral tubercles fairly well-marked, the transverse mesonotal furrow shallow, the ridge or carina behind it thick; the basal portion of the metanotum short, rather flat, slightly raised; metanotal spines short, erect and stout. Pedicel stout, the 1st node in profile subtriangular, anteriorly curved inwards, transverse and emarginate above, without any appendix

beneath; 2nd node rounded above, about half as broad again as long; abdomen almost circular, depressed.

☿. Brownish yellow, the legs clear pale yellow, the abdomen a dingy dull yellow; head, thorax in front and abdomen smooth and shining; the sides of the mesothorax and the metathorax finely punctured, rugulose; disc of the pronotum with a few irregular long transverse punctures. Head very broadly oval, the sides very convex, a distinct but very narrow posterior margin; antennæ long, the scape extending well beyond the top of the head. Thorax: the shape of the pronotum as in the ♃; basal portion of metanotum short, the metanotal spines very short but acute. Pedicel elongate; the 1st node short and thick and little raised, broader than long; 2nd node globose; abdomen broadly oval.

Length, ♃ 4·5: ☿ 1·5–2 mm.

Hab. Burma: Pegu Yoma, 1500 ft. (*Allan*); Bernardmyo 6000 ft. (*Bingham*).

304. **Phidole himalayana**, *Forel, Rev. Suisse Zool.* x (1902), pp. 185 & 199, ♃ ☿ *min.*; *id. Jour. Bomb. N. H. Soc.* xiv (1902), pp. 538 & 546.

♃. Light chestnut-red, the abdomen posteriorly shaded with fuscous above, the mandibles, antennæ and legs not lighter in colour than the rest of the body. Pilosity and pubescence as in *P. indica*. Head rectangular, as broad posteriorly as in front, the cheeks convex, longitudinally striate as in the above-named species, but the striæ wider apart and less distinct, especially on the lateral lobes of the head; the depression on the vertex shallower and less conspicuous. Thorax with the pronotum strongly convex, somewhat produced at the sides; mesonotum with the transverse carina not bigibbous as in *P. indica*; metanotum broader than in that species, the spines short. The rest as in *P. indica*.

☿. Head, thorax and pedicel light bright chestnut-red; abdomen yellowish, somewhat fuscous above. Pilosity, pubescence and sculpture as in *P. indica*. Scape of the antennæ short, as short as in *P. rotschana*, not extending beyond the top of the head by more than one-fifth of its length from insertion; head shorter and less oval than in either of the above species; thorax comparatively longer, the metanotal spines very short.

Length, ♃ 3·5–4; ☿ 2·5 mm.

Hab. The Himalayas from Kashmir (*Lobinière*) to Sikhim (*Wroughton*).

Genus MYRMICA.

Myrmica, *Latr. Nouv. Dict. d'Hist. Nat.* xxiv (1804), p. 179.
Manica, *Jurine, Hym.* 1807, p. 276.

Type, *M. rubra*, L., from Europe.

Range. Temperate regions of both hemispheres, and high elevations in the tropical or subtropical zones.

☿. Head more or less oval, but always with a distinct posterior margin; mandibles broad, the masticatory margin dentate; maxillary palpi 6-, labial palpi 4-jointed; clypeus strongly convex in the middle, posteriorly produced between the bases of the antennæ, obtusely angular and well-defined; antennal carinæ short, wide apart; antennæ 12-jointed, the club of the flagellum moderately distinct, formed by the apical 3, 4 or 5 joints; frontal area triangular, depressed. Thorax anteriorly rounded, convex, posteriorly

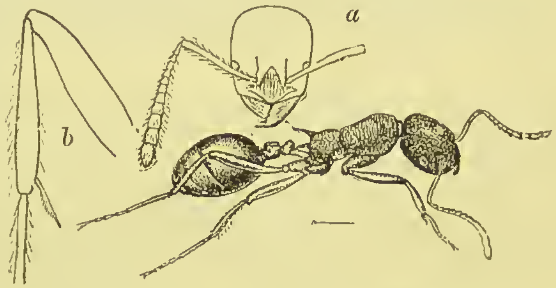

Fig. 81.—*Myrmica rugosa*, ☿. *a.* Head; *b.* Tibia with pectinate spur.

more or less rounded from one side to the other; pro-mesonotal suture obsolete, meso-metanotal suture more or less distinct, the thorax often slightly emarginate at that point; metanotum (in all Indian species) armed at the posterior lateral angles with two long curved acute spines; legs moderately long and stout. Pedicel: the 1st node petiolate anteriorly, in front more or less truncate above, posteriorly rounded to the apex by a gradual curve; 2nd node globose or subglobose, transverse, sometimes as long as broad or even longer; abdomen oval.

♀. Head, pedicel and legs as in the ☿. Metanotum generally with two teeth or two obtuse tubercles. Wings with one cubital cell half divided by an incomplete nervure, and one discoidal cell.

♂. The mandibles as in the ☿, dentate. Head smaller; eyes very large, ocelli prominent; antennæ 13-jointed, the scape and the slightly thickened apical 5 joints of the flagellum, forming the club, subequal; thorax massive, the mesonotum raised above the pronotum and slightly gibbous with converging grooves; metanotum much longer than in the ♀, with the posterior lateral angles of the slightly sloping basal portion rather prominent, the apical portion obliquely truncate and slightly concave; pedicel much as in the ☿; abdomen narrower and smaller than in the ♀. Wings as in the ♀, but the division of the cubital cell more developed, though still not quite complete.

Key to the Species.

a. Thorax more or less longitudinally rugose. striate.	
a'. Medial portion of clypeus produced, angular, the apex obtuse.	
a^2. Length 6 mm.; metanotal spines long, as long as the basal face of metanotum.	*M. rugosa*, p. 268.
b^2. Length 3·5–4·5 mm.; metanotal spines short, only about half as long as basal face of metanotum	*M. smythiesi*, p. 269.
b'. Medial portion of clypeus not produced, not angular, transverse.	
a^2. Head regularly longitudinally striate, the striæ not broken or reticulate	*M. ritæ*, p. 267.
b^2. Head irregularly longitudinally striate, the striæ coarser, broken and posteriorly reticulate	*M. margaritæ*, p. 267.
b. Thorax transversely rugose striate	*M. inezæ*, p. 268.

305. **Myrmica ritæ**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 501, ☿, pl. 11, fig. 27.

☿. Head and antennæ reddish yellow, the head shaded with fuscous on the front; thorax and pedicel dark brown, almost black, legs yellow, the abdomen dark brown above and below in the middle, yellowish at base, along the sides and at apex; pilosity pale, very sparse, pubescence entirely wanting. Head shining, longitudinally coarsely sulco-striate, mandibles shining, striate at base; clypeus narrow, the striæ on the medial portion subobsolete; frontal area depressed, smooth and shining; antennal carinæ somewhat wide apart, parallel, reaching very nearly level with the top of the eyes; antennæ long, the scape extending beyond the top of the head; eyes prominent, lateral, placed about the middle of the head; head more or less oval, but with a distinct slightly emarginate posterior border, the cheeks very convex. Thorax elongate, coarsely rugose, with broken longitudinal furrows; the metanotal backward-pointing spines smooth, slender and acute; legs smooth, very long and slender. Pedicel: the nodes large, coarsely sculptured, the posterior node posteriorly and above somewhat smoother than the anterior node; abdomen subglobose, highly polished, smooth and shining.

Length, ☿ 4·5–6 mm.

Hab. Tenasserim, Muleyit, 3000–4500 ft. (*Fea*).

306. **Myrmica margaritæ**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 502, ☿.

☿. Head, thorax and pedicel dark piceous brown, head anteriorly reddish brown, the mandibles and antennæ brownish yellow, legs and abdomen clear, somewhat pellucid ochraceous yellow; pilosity short and sparse, pubescence absent. Head with the mandibles

oval, very convex in front, narrow posteriorly, with a distinct though limited posterior margin, very coarsely rugose, with broken irregular longitudinal coarse striæ; mandibles very finely striate; the triangular median portion of the clypeus obsoletely coarsely striate; frontal area depressed, smooth; antennal carinæ wide apart, short and parallel; eyes prominent, placed rather more forward than in *M. ritæ*; antennæ long and slender, the scape extending beyond the top of the head. Thorax elongate, with sculpture similar to that on the head: metanotal spines long and slender, pointing backwards and slightly curved downwards; legs long and slender. Pedicel as in *M. ritæ*; abdomen subglobose, very smooth, polished and shining.

Length, ☿ 5–5·25 mm.

Hab. Tenasserim, Muleyit, 3000–5500 ft.

307. **Myrmica inezæ**, *Forel, Rev. Suisse Zool.* x (1902), p. 226.

☿. Black, the mandibles, antennæ, metanotal spines and legs reddish brown; head, thorax and nodes of pedicel coarsely and closely striate rugose, the striæ on the head longitudinal and regular, on the thorax and pedicel transverse and somewhat irregular; abdomen highly polished, smooth and shining; pilosity light reddish, fairly abundant and long, oblique on the antennæ and legs. Head without the mandibles broadly oval, rounded posteriorly, regularly convex; mandibles triangular, finely longitudinally striate, the masticatory margin denticulate; clypeus broad, the medial portion slightly convex, broadly produced and rounded posteriorly: antennal carinæ short, wide apart; antennæ long and somewhat thick, the scape extending well beyond the top of the head; eyes large, lateral, closer to the anterior than to the posterior margin of the head. Thorax elongate, slightly rounded above, very lightly impressed at the meso-metanotal suture; metanotal spines longer than in *M. rugosa* and subvertical, acute at apex; legs long and somewhat stout. Pedicel: the 1st node bluntly conical, a little longer than broad, compressed, with a long petiole in front; 2nd node rounded, a little longer than broad, and slightly broader than the 1st node; abdomen convex, oval, twice as long as broad.

Length, ☿ a little over 5 mm.

Hab. Central Provinces, India; Pachmarhi (*Schurr*).

308. **Myrmica rugosa**, *Mayr, Novara Reise, Zool., Formicid.* 1865, p. 19 footnote, ☿.

☿. Brownish black to jet-black, mandibles, antennæ and legs dark castaneous; head, thorax and pedicel striate, rugose, the head posteriorly and the thorax in front on the pronotum and mesonotum reticulate; on the metanotum and the sides of the thorax the striæ are more regular and longitudinal, as they are on the head anteriorly; abdomen highly polished, smooth and shining; pilosity pale, rather long and plentiful on the head, thorax and

abdomen, shorter and oblique on the antennæ and legs. Head convex, broadly suboval, with a distinct posterior margin; mandibles finely longitudinally striate, the masticatory margin denticulate, the apical tooth very acute; clypeus somewhat diamond-shaped, slightly convex in the middle, the apex anteriorly produced but obtuse, the posterior margin rounded; antennal carinæ short, wide apart; antennæ not so long as in *M. inezæ*, the scape not passing beyond the top of the head. Thorax elongate, impressed at the meso-metanotal suture; the basal portion of the metanotum rectangular above, the spines long, pointing backwards and slightly curved, the apical portion concave and smooth. Pedicel elongate, the nodes rugulose; the 1st node with a short petiole anteriorly, posteriorly constricted, longer than broad, subcubical; 2nd node quadrate, the angles rounded, convex above, as broad as long; abdomen oval.

Length, ☿ 5·5–6 mm.

Hab. The Himalayas along their whole length and above 4000 ft. (*Smythies & Möller*).

309. **Myrmica smythiesi**, *Forel, Rev. Suisse Zool.* x (1902), p. 226.

☿. Closely resembling *M. rugosa*, Mayr, but smaller, of slighter build, and typically a clear reddish brown, varying however to black. The whole insect is more shining than *M. rugosa*, with the sculpture similar but more feeble, and the pilosity more sparse, the scape being nearly smooth and shining, the legs having a close oblique pubescence. It differs also from *M. rugosa* in the flagellum of the antennæ being more clavate, the mesonotum higher and more convex, the meso-metanotal suture more strongly impressed above, and the metanotal spines shorter. Pedicel: the 1st node is proportionately thicker, and the 2nd not so broad, both nodes are longitudinally rugose and punctured; abdomen smooth and shining.

Length, ☿ 3·5–4·5 mm.

Hab. N.W. Himalayas above 7000 ft. (*Smythies*); Sikhim above 4000 ft. (*Möller*).

Var. *rupestris*, Forel, is black with the sculpture coarser and more pronounced.

The race *carbonaria*, Forel, seems to me only a still smaller, more slender form of *smythiesi* var. *rupestris*, and to differ chiefly in having rather long and divergent spines.

Genus APHÆNOGASTER*.

Myrmica, pt., *Lucas, Explor. Sc. Algérie, Zool.* iii (1846), p. 301, pl. 16, fig. 10, ☿.

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* Professor Emery (Zool. Jahrb. Syst. viii. 1895, p. 297) has quite rightly placed *Aphænogaster*, Mayr, *Ischnomyrmex*, Mayr, and *Messor*, Forel, as subgenera under Westwood's genus *Stenamma*. Typical *Stenamma* is not, so far as I know, found in India, Burma or Ceylon, while forms of both *Aphænogaster* and of *Messor* occur. I have preferred, therefore, to consider these two

Aphænogaster, *Mayr, Verh. zool.-bot. Ver. Wien*, iii (1853), p. 107.
Ischnomyrmex, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 738.

Type, *A. sardous*, Mayr, from Sardinia.

Range. Both hemispheres.

☿. Of slender form. Head longer than broad, often elongated posteriorly into a neck; mandibles subtriangular, the masticatory margin dentate, the outer margin not strongly curved; clypeus somewhat flat, the anterior margin transverse, posteriorly produced between the bases of the antennæ, and the margin rounded; frontal area depressed; antennal carinæ short, posteriorly convergent, antennal and clypeal hollows large, confluent; antennæ 12-jointed, slender and filiform, the club of the flagellum not much thickened, formed of the apical four joints; eyes of moderate size, lateral, placed about the middle of the head; ocelli absent. Thorax narrow, elongate; pro-mesonotal suture generally slight, meso-metanotal suture very distinct; metanotal spines short, triangular, dentiform, generally more or less erect; legs remarkably long and slender, the intermediate and posterior tibiæ with one simple spur, the spur of the anterior tibiæ pectinate, claws simple. Pedicel elongate; the 1st node subconical, rounded above, generally with a long petiole in front; 2nd node oval, usually longer than broad; abdomen oval, very convex above and below. Pilosity more or less abundant, long and somewhat coarse, often setiform, the hairs obtuse at apex.

♀. Resembles the ☿; ocelli present; wings long and somewhat narrow, with one cubital cell.

♂. Antennæ 13-jointed, the scape very short, the apical 5 joints of the flagellum the longest; wings as in the ♀.

Key to the Species.

A. Head posteriorly produced and constricted, forming a more or less cylindrical neck or collar.
- *a.* Metanotum transversely rugose above, obliquely and somewhat coarsely striate on the sides . . . . *A. beccarii*, p. 271.
- *b.* Metanotum smooth or at most with a few scattered punctures.
  - *a'*. Length under 5 mm.; 2nd node of pedicel as broad as long . . . . *A. longipes*, p. 272.
  - *b'*. Length over 5 mm.; 2nd node of pedicel distinctly nearly twice as long as broad . . *A. feæ*, p. 273.

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as true genera so far as the limited fauna dealt with in this volume is concerned. *Ischnomyrmex* (type *Myrmica longipes*, Smith) I regard simply as an exaggerated slender form of *Aphænogaster*. On the other hand, *Messor*, Forel (type *Formica barbara*, Linn.), seems to me clearly differentiated, not only by its far more massive build, but by the polymorphism of its workers. It is, moreover, a strict vegetarian and harvester like *Holcomyrmex*, whereas *Aphænogaster* is carnivorous.

B. Head posteriorly not produced into a neck.
  a. Pronotum seen from the front distinctly laterally bituberculate .... *A. rothneyi*, p. 273.
  b. Pronotum not laterally bituberculate.
    a'. Head and thorax coarsely, very closely striate-reticulate, punctured and rugose .. *A. schurri*, p. 274.
    b'. Head and thorax very slightly and sparsely sculptured, shining.
      a^2. Pro- and mesonotum forming one continuous convexity, mesonotum anteriorly not raised into a transverse ridge or crest. *A. sagei*, p. 275.
      b^2. Pro- and mesonotnm not forming one continuous convexity, pro-mesonotal suture distinct, anterior margin of mesonotum behind the suture raised into a ridge or crest.
        a^3. Antennæ very slender; joints 2–7 of flagellum three times as long as broad. *A. cristata*, p. 276.
        b^3. Antennæ a little more robust; joints 2–7 of flagellum only a little longer than broad .... *A. smythiesi*, p. 276.

310. **Aphænogaster beccarii**, *Emery* (Ischnomyrmex), *Ann. Mus. Civ. Gen.* xxv (1887), p. 456, ☿ ♂, pl. i, fig. 12, ♂.

☿. Light castaneous brown, smooth and shining, the thorax posteriorly and the abdomen slightly darker, the head in certain lights indistinctly finely striate on the front between the eyes; mesonotum posteriorly and metanotum coarsely striate, sculptured

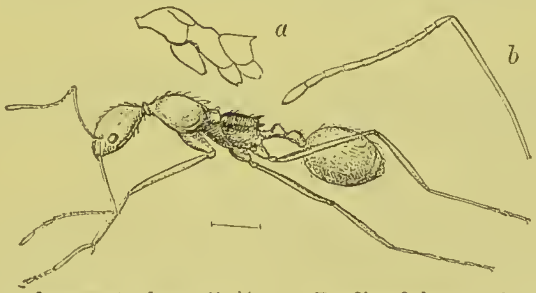

Fig. 82.—*Aphænogaster beccarii*, ☿. *a*. Profile of thorax; *b*. Antenna.

and rugose, the striæ transverse on the metanotum above, oblique on the sides; the whole head, thorax and abdomen with scattered minute piligerous tubercles. Head, including the mandibles, viewed from above elongate, oval, broadest at the eyes, which are large, somewhat elongate and oval; mandibles triangular, broad at the masticatory margin, which is furnished with three conspicuous teeth towards the apex, finely striate at base; clypeus ample, rounded anteriorly, convex in the middle, antennal hollows very large; antennal carinæ, the distinct carinæ between the eyes and the antennal hollows convergent posteriorly; antennæ very long and filiform, the scape extending well beyond the posterior

margin of the head, the basal joint of the flagellum longer than the 2nd, the apical four joints longest of all; head posteriorly attenuated into a cylindrical neck, the posterior border of which is strongly margined. Thorax elongate, narrow, anteriorly attenuated as the head is posteriorly, but not so long nor margined, above convex; pro-mesonotal suture indicated but not distinct; mesonotum oblique, convex above, roundly raised a little posteriorly; meso-metanotal suture deeply impressed; the basal portion of the metanotum elongate, rounded, above the apex divided into two acute dentate angles, the emargination between them being smooth and polished; legs very long and slender. Pedicel: the 1st node conical, rounded above, with an elongate petiole in front and a shorter one posteriorly; 2nd node from above suboval, rounded above; abdomen short, broadly oval.

♀. Closely resembles the ☿, but the sculpture of the head is more marked and the transverse rugosity on the mesonotum and metanotum is coarser. The antennæ and legs are lighter in colour; the scutellum gibbous. The wings as in the ♂, but the nervures darker.

"♂. Black; the mandibles, the flagellum of the antennæ, the articulations of the legs and the genitalia testaceous; the apical 5 joints of the flagellum subequal and longest; legs slender. The fore wing lightly infuscate, the costa pale; the transverse nervure joins the external branch of the cubital nervure. The form of the thorax is shown in the figure." (*Emery.*)

Length, ☿ 6·5–7; ♀ 8; ♂ 6 mm.

Hab. Recorded from Western India, Bombay (*Beccari*); Kanara (*Aitken*); Sumatra (*Beccari*).

311. **Aphænogaster longipes**, *Smith* (Myrmica), *Journ. Linn. Soc.* ii (1857), p. 70, pl. 1, fig. 6, ☿; *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 503.

☿. Head, thorax, legs and pedicel yellowish or reddish brown, abdomen dark brown, some specimens are entirely dark brown; smooth, highly polished and shining, very slender, the metanotum only very minutely and closely punctured, in certain lights subopaque. Pilosity pale yellow, long and most plentiful on the scapes of the antennæ and tibiæ of the legs. Head with the mandibles elongate and oval, produced posteriorly into a long constricted neck with the margin recurved; mandibles finely longitudinally striate; clypeus slightly convex in the middle, its anterior margin arched; frontal area sunk and depressed; antennal hollows deep and large, a few striæ between them and the eyes; antennæ very slender and filiform, the scape extending beyond the posterior margin of the head by about one-third of its length; flagellum without any distinct club, but the apical 4 joints much elongated; eyes lateral, proportionately somewhat large, prominent, and much closer to the anterior than to the posterior margin of the head. Thorax narrow, elongate, the pronotum convex, produced anteriorly

to form part of the long neck; pro-mesonotal suture tolerably distinct; the mesonotum behind the suture forms a raised transverse ridge, posterior to which it curves downwards to the very distinct meso-metanotal suture; the basal portion of the metanotum long, horizontal, and with two slender, very acute erect spines at the posterior lateral angles, apical portion steeply sloped, a little convex; legs remarkably long and very slender. Pedicel seen from above with the 1st node only half the width of the 2nd, the latter broadly oval, rounded above, both shortly petiolate in front; abdomen a broad regular oval.

Length, ☿ 4·5 mm.

Hab. Tenasserim, extending into the Malayan subregion.

312. **Aphænogaster feæ**, *Emery* (Ischnomyrmex), *Ann. Mus. Civ. Gen.* xxvii (1889), p. 503, ☿.

☿. Piceous brown, smooth, polished and shining; mandibles, antennæ and legs yellowish brown; thorax posteriorly with a little irregular sculpture; pilosity rather sparse, the hairs long, thick and obtuse. Head with the mandibles oval, prolonged posteriorly into a neck with the posterior border margined; mandibles finely striate at base, the masticatory margin with two teeth at apex, and above denticulate; clypeus slightly convex; antennal carinæ short, very prominent, convergent posteriorly; antennal hollows large, smooth inside, margined laterally by prominent carinæ; antennæ long and filiform, the scape extending beyond the top of the head by about one-third of its length, the basal joint of the flagellum slightly longer than the 2nd joint, the club formed of the apical 4 joints, which are only slightly thickened and densely pubescent; eyes lateral, subacuminate anteriorly. Thorax narrow, elongate; the pro- and mesonotum forming one long convexity, the pro-mesonotal suture obsolete above; the thorax seen in profile emarginate at the meso-metanotal suture; basal portion of metanotum elongate, slightly flattened above, posteriorly with two erect, acute, short spines or teeth; legs very slender and long, the pilosity on them oblique. Pedicel slender, the 1st node oval, longer than broad, the 2nd node oval, much higher and slightly broader than the 1st; abdomen broadly oval.

Length, ☿ 5·5–6·5 mm.

Hab. Tenasserim, Thagata (*Fea*).

313. **Aphænogaster rothneyi**, *Forel* (Stenamma (Aphænogaster)), *Rev. Suisse Zool.* x (1902) p. 224, ☿.

☿. Brown, the head darker than the rest of the body, mandibles, antennæ and legs brownish yellow; head and thorax finely reticulate, striate, subopaque, the metanotum more coarsely and transversely sculptured; abdomen polished, smooth and shining. Head with the mandibles oval, not constricted into a neck posteriorly, as in *A. beccarii*; mandibles longer than in that species, finely striate at base, with three largish acute teeth at the apex of the masticatory

margin and denticulate above; clypeus proportionately much smaller, its anterior margin rounded; antennal hollows not so large, antennal carinæ prominent, convergent posteriorly; antennæ very long and filiform, the scape passing beyond the top of the head by about one-fourth of its length, flagellum with the proportions of the joints as in *A. beccarii*. Thorax elongate, narrow, the pronotum not constricted into a neck anteriorly, posteriorly slightly raised into lateral tubercles; the pro-mesonotal suture well-marked; the mesonotum slightly raised, in some specimens with two transverse impressions; metanotum elongate, rounded above; metanotal spines thick at base, acute at apex, and as long as the distance between them at base; legs long and slender. Pedicel: 1st joint with the node conical, rounded above, petiolate in front and posteriorly, the anterior portion more slender and twice as long as the posterior portion; 2nd joint with a pyriform node strongly constricted anteriorly; abdomen very broadly oval, subglobose.

Length, ☿ 5·5–6·5 mm.

Hab. North-west Himalayas to Sikhim, Mussoorie (*Rothney*); Darjeeling (*Möller*); Central India, Pachmarhi (*Schurr*).

314. **Aphænogaster schurri**, *Forel* (Stenamma (Aphænogaster)). *Rev. Suisse Zool.* x (1902), p. 223.

☿. Head and posterior half of the thorax black, the pronotum and anterior half of the mesonotum black with a deep red tinge, mandibles, antennæ, legs, pedicel and abdomen yellowish brown: head and thorax very coarsely longitudinally rugose striate, the striæ broken and irregular (the sculpture resembles that of *Myrmica margaritæ*); legs, pedicel and abdomen highly polished, smooth and shining; pilosity white, rather long and most abundant on the abdomen above, the hairs as usual obtuse at apex. Head oval but with a distinct posterior margin, not elongated into a neck posteriorly; mandibles finely and closely longitudinally striate, the masticatory margin dentate, the apical three teeth the largest; clypeus transversely slightly convex, its anterior margin rounded; antennal hollows rugose, large, not margined laterally by a carina as apart from the rugosity between the eyes and the antennal hollows; antennal carinæ as in *A. rothneyi*, but much more prominent; antennæ long, filiform, the scape extending beyond the top of the head by about one-fourth of its length; joints 2–7 of the flagellum distinctly shorter than in *A. rothneyi*, the club formed of the apical four joints; eyes lateral, round and prominent, equidistant from the anterior and posterior margins of the head. Thorax very nearly as broad as the head, the pronotum depressed a little in the middle; pro-mesonotal suture very distinct, the mesonotum raised so as to form, when viewed from the front, a transverse ridge; meso-metanotal suture deeply impressed, the thorax above emarginate at the suture; basal portion of metanotum convex, elongate, the rugosities particularly deep and coarse above; the metanotal spines close together, very erect and robust, distinctly longer than the interval between their bases; apical face of the

metanotum smooth. Pedicel: the 1st node conical, rounded above, inclined forward, steeply sloped posteriorly; 2nd node very broad, only a little longer than broad, rounded above; abdomen broadly oval, finely and somewhat obsoletely longitudinally striate at base.

Length, ☿ 5·5–6 mm.

Hab. Pachmarhi, Central India (*Schurr*); Upper Burma, Ruby Mines, 6000 ft. (*Bingham*).

The above described species may be distinct from *A. schurri*, but my specimens from the Ruby Mines district agree tolerably well with Dr. Forel's description of *A. schurri*, except that they are distinctly larger, with the thorax more robust than the measurements and details recorded by Dr. Forel. In the British Museum collection there is a single specimen of this species labelled "F. Smith Coll., India." I noticed in members of this species the remarkable method of carrying the abdomen tucked in underneath the thorax as described by Wroughton (Jour. Bomb. N. H. Soc. vii (1892), p. 182).

315. **Aphænogaster sagei**, *Forel* (Stenamma (Aphænogaster)), *Rev. Suisse Zool.* x (1902), p. 221, ☿ ♀ ♂.

☿. A beautiful shining polished black, in certain lights the legs dark chestnut, the tarsi reddish brown; head and thorax somewhat irregularly longitudinally striate, with a few scattered punctures; the metanotum between the spines and at apex, the pedicel and abdomen very smooth and highly polished; pilosity fairly plentiful, hoary white in colour. Head without the mandibles somewhat rectangular, the posterior lateral angles rounded, the cheeks very slightly convex, almost straight, the head not produced posteriorly into a neck; mandibles rather broadly triangular, finely longitudinally striate, the masticatory margin as in *A. rothneyi*; clypeus slightly emarginate in the middle of its anterior border; antennal hollows large; the frontal area very distinct; antennæ long and filiform, the scape extending by about one-fifth of its length beyond the top of the head; flagellum proportionately shorter, with the basal joints shorter than in *A. rothneyi* or *A. beccarii*, and with the apical four joints thicker, forming a distinct club. Thorax somewhat more massive, the pro- and mesonotum forming a single convexity, but the pro-mesonotal suture distinct; metanotum longitudinally convex and rounded, the meso-metanotal suture deep, the thorax in profile emarginate above at the suture; the apex of the basal portion of the metanotum cleft and produced, forming two triangular short spines. Pedicel: the 1st node obliquely sloped posteriorly, rounded above, and with a short, somewhat thick petiole in front; 2nd node longer than broad; abdomen longer than broad and a little broader posteriorly than at base, rounded in front and at apex.

"♀. Identical with the ☿ including the spines. Mesonotum striate like the rest of the thorax, often narrower than the head. Wings very long and pubescent, a little tinted with brownish, with

the nervures and the stigma brown. Fore wing with a single cubital cell."

"♂. Mandibles with 4 or 5 teeth. Head much longer than broad. Scape as long as the first four joints of the flagellum. Scutellum very prominent. The basal face of the metanotum has a deep transverse impression posterior to its middle, behind that two strong obtuse teeth. Anteriorly it rises with a slope towards the postscutellum. Nodes of the pedicel very low and depressed, the first a little distinct from its pedicel. Pilosity longer and more pointed than in the ♀. The rest resembles the ♀. A single cubital cell." (*Forel.*)

Length, ☿ 5–6; ♀ 6; ♂ 5·3 mm.

Hab. The Himalayas, Lahoul (*Sage*), extending into Tibet.

316. **Aphænogaster cristata**, *Forel* (Stenamma (Aphænogaster)), *Rev. Suisse Zool.* x (1902), p. 225, ☿.

"☿. More slender than the preceding. The head is not oval but the anterior margin is broader. Behind the eyes it is constricted, the sides slightly convex, curving gradually to the articulation with the thorax. Dimensions of the antennæ as in *A. rothneyi*. Pronotum without tubercles. The mesonotum has in its middle a raised transverse crest-like projection, somewhat more pinched and flattened and a little more prominent than the transverse ridge or carina on the mesonotum of *A. smythiesi*. Behind this crest the mesonotum is sloping and bears a transverse medial impression. Basal face of the metanotum convex as in *A. patruelis*. Spines rather stout, wide apart, as long as two-thirds of the distance between them. First node a little broader than in *A. rothneyi*, with a slight petiole. Second node as in *A. schurri*, but a little shorter and broader. Smooth and shining all over. Front of the head and metanotum in part feebly reticulate. Some few striæ around the eyes. Pilosity scattered, more setiform and obtuse than in the two preceding species. That of the tibiæ and the scape as in *A. schurri*. Brown; legs, mandibles and antennæ yellowish. This form may be merely a race of *A. rothneyi*." (*Forel.*)

Length, ☿ 5·5 mm.

Hab. North-west Himalayas, Dharmsála (*Sage*). Unknown to me.

317. **Aphænogaster smythiesi**, *Forel* (Stenamma (Aphænogaster), *Rev. Suisse Zool.* x (1902), p. 222, ☿ ♀ ♂.

☿. Dark castaneous brown to piceous black, smooth, polished and shining, with scattered raised piligerous points and a few indistinct longitudinal striæ on the front of the head and on the metanotum; pilosity comparatively sparse, hoary white and obtuse, most plentiful on the abdomen. Head without the mandibles rectangular, the posterior lateral angles rounded, the cheeks somewhat straight, the occipital margin broad at the articulation with the thorax and not prolonged backwards into a neck; mandibles

triangular, striate at base, the masticatory margin dentate at apex, denticulate above. Thorax narrow, the pronotum convex, the pro-mesonotal suture distinct; the mesonotum sloping obliquely back, its anterior margin raised, forming a thick transverse ridge which in some specimens is emarginate in the middle; thorax in profile emarginate at the meso-metanotal suture, which is deeply marked; metanotum rounded from side to side and a little convex longitudinally; the metanotal spines broad at base, short and acute. Legs long, the pilosity on them yellowish, more dense than on the body and oblique. Pedicel with the nodes as in *A. sagei*, but proportionately a little longer; abdomen broadly oval.

"♀. Resembles the ☿; the spines long. Head longitudinally, metanotum transversely striate, the striæ distinct between the spines on the latter. Mesonotum broader than the head. Thorax short. Wings a little darker than in the ♂." (*Forel.*)

"♂. Mandibles very long, the masticatory margin with 5 or 6 teeth. Head elongate. Antennæ and metanotum as in *A. sagei*, but the posterior portion of the latter cubical, without teeth behind the impression, only two blunt tubercles. Nodes of the pedicel more raised. Wings subhyaline, with the nervures pale and having two cubital cells. Colour and sculpture of the ☿." (*Forel.*)

Length, ☿ 4·5–5·5; ♀ 7; ♂ 4 mm.

Hab. North-west Himalayas (*Smythies & Wood-Mason*).

Genus MESSOR.

Formica, pt., *Linn. Syst. Nat.* 12th ed. i (1767), p. 962, ☿.
Atta, pt., *Illiger, Mag. f. Ins.* vi (1807), p. 194.
Myrmica, pt., *Lucas, Explor. Sc. Algérie, Zool.* iii (1846), p. 300.
Aphænogaster, pt., *Roger, Verz. d. Formicid.* (*Berl. ent. Zeit.*) 1863, p. 29.
Messor, *Forel, Ann. Soc. Ent. Belge,* xxxiv (1890), *C. R.* p. lxviii.

Type, *M. barbarus*, Linn., from South Europe

Range. Both hemipheres.

☿ *max.* Head without the mandibles square, the occiput transverse, slightly emarginate, as broad as the anterior margin; mandibles very massive, the outer margin strongly curved, the masticatory margin dentate, the teeth often obsolete, the inner margin very thick, concave above; clypeus flat, only a little convex in the middle, produced back between the bases of the antennæ, the anterior margin transverse or waved; antennal and clypeal hollows confluent; antennal carinæ short, wide apart, parallel; antennæ 12-jointed, filiform, with no distinct club; joints 1–10 of the flagellum subequal, the apical joint slightly the longest; maxillary palpi 4- or 5-, labial 3-jointed; eyes somewhat small, placed about the middle of the sides of the head; ocelli absent. Thorax narrower than the head but massive, the pronotum rounded in front; the mesonotum raised anteriorly above the levo of the pronotum, posteriorly steeply sloped, with a transverse impression; pro-mesonotal suture distinct; meso-metanotal suture

deeply marked; the thorax in profile more or less emarginate at this suture; metanotum with a long, level, rather flat basal portion, the posterior lateral angles of which are either dentate or entire, but never with spines as in *Aphænogaster*, apex truncate; legs rather long and slender. Pedicel: the 1st node conical, rounded above, the front face curved inwards, and furnished with a tolerably long petiole anteriorly; 2nd node broader, rounded above, about as broad as long; abdomen rather depressed, very broadly oval.

☿ *med.* Closely resembles the ☿ *max.*, but is smaller and has the head very much smaller in proportion to the body, proportionately also the pronotum is longer, more rounded above, and the mesonotum not so raised.

☿ *min.* Still smaller, the pro- and mesonotum form one convexity, there is no transverse impression on the latter, and the metanotum is entire, with only the posterior lateral angles of the basal portion somewhat prominent.

♀. Resembles the ☿ *max.*, but the head is smaller, the eyes larger, the ocelli present, the antennal hollows smaller, the thorax very large and massive; the pronotum vertical, when viewed from above, hidden under the large, slightly gibbous mesonotum; scutellum very large, projecting posteriorly over the metanotum, this latter with a very short sloping basal portion and the apex vertically truncate, flat or slightly concave, entire. Pedicel thick and massive; the 1st node broad, transverse, its upper margin rounded; the 2nd node broad, about as broad as long, and attached by its whole posterior face to the abdomen; abdomen massive, very broadly oval, its anterior margin transverse. Fore wing with 2 cubital cells.

♂. Head proportionately small, longer than broad and broader posteriorly than in front; mandibles broad, the masticatory margin dentate; clypeus narrow, truncate anteriorly; antennæ 13-jointed, filiform, the scape short, about equal to the 1st three joints of the flagellum; eyes large, ocelli present. Thorax, legs and pedicel as in the ♀, the first proportionately just as large and massive; abdomen slightly attenuate towards the apex, the external genital laminæ broad.

I have no personal experience of the species of this genus, but Mr. Wroughton records *M. instabilis* as a harvester. From its close affinity to *Holcomyrmex*, essentially a harvester, this was to be expected.

Key to the Species.

a. Metanotum wholly unarmed .... *M. barbarus*, var. *instabilis*, p. 278.

b. Metanotum posteriorly distinctly bidentate or sub-bidentate .... *M. himalayanus*, p. 279.

318. **Messor barbarus**, *Linn.* (Formica) *Syst. Nat.* 12th ed. i (1767), p. 962.

Atta instabilis, *Smith*, *Cat.* vi (1858), p. 163, ☿ ♂.

Aphænogaster barbara, *Linn.*, var. punctata, *Forel, Jour. As. Soc. Beng.* lv (1886), p. 248, ☿.

Note.—True *M. barbarus* does not, so far as I know, occur within our limits: the form described below is var. *instabilis*, Smith, identical, so far as the specimens in the British Museum go, with specimens of var. *punctata*, named by Dr. Forel.

☿ *maj.* Dark shining red, the abdomen in some specimens black, the scape of the antennæ and the tarsi pale. Head in some specimens finely longitudinally striate, in the majority smooth, with a few obsolete striæ and scattered punctures; thorax above coarsely transversely, the sides obliquely striate; legs, pedicel

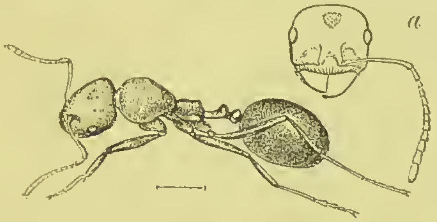

Fig. 83.—*Messor barbarus*, var. *instabilis*, ☿. *a.* Head from front.

and abdomen highly polished, smooth and shining; the legs with a few widely scattered punctures, nodes of the pedicel with some half obsolete transverse striæ above. Pilosity almost entirely wanting, reduced to a very few erect soft, not obtuse hairs on the underside of the head and abdomen and on the thorax above. Mandibles finely longitudinally striate. Metanotal spines or teeth entirely wanting. For the rest the characters of the genus.

☿ *min.* Resembles the ☿ *maj.*, but is of course smaller; the head invariably smooth, highly polished and shining, with no trace of striæ and fewer punctures than in the ☿ *maj.*; the sculpture of the thorax much more feeble; metanotum unarmed as in the ☿ *maj.*

♀. Closely resembles the ☿ *maj.*, but is larger and darker, almost black, the head anteriorly subopaque, longitudinally striate, the posterior portion with the thorax and abdomen sparsely punctured, polished and shining; the metanotum and nodes of pedicel transversely striate; wings hyaline.

♂. Resembles the ♀, but is smaller, with a considerably smaller head and proportionately larger and broader wings. Pilosity and sculpture more dense than in the ♀; mandibles with a distinct dentate masticatory margin; antennæ long, the scape half the length of the flagellum; neuration of the wings as in the ♀.

Length, ☿ ☿ 4–9; ♀ 11–12·5; ♂ 7·5–8 mm.

Hab. Recorded so far from the North-west Himalayas, and from Cochin.

319. **Messor himalayanus**, *Forel.*

Stenamma (Messor) barbarum, *race* himalayanum, *Forel, Rev. Suisse Zool.* x (1902), p. 220.

☿ *max.* Black, shining, the mandibles reddish brown, the

flagellum of the antennæ and the legs castaneous, the scape fuscous brown. Head very finely longitudinally striate; thorax more coarsely and irregularly rugose striate; the mesonotum, apex of the metanotum, and the abdomen smooth and shining, the sides and base of the metanotum and the nodes of the pedicel coarsely transversely rugose. Pilosity abundant, setiform, of a clear yellowish white, very conspicuous. For the rest the characters of the genus.

☿ *med.* Closely resembles the ☿ *maj.*, but differs in being smaller, and in the sculpture of the head and thorax, but especially of the latter, being much finer and closer, giving the whole insect a much more opaque appearance; the metanotal spines or teeth are smaller and feebler.

☿ *min.* Resembles the ☿ *med.*, but is considerably smaller and a little more shining, the very fine striation of the head seems almost obsolete in certain lights. Thorax subopaque, metanotum transversely striate, metanotal teeth obsolete.

♀. Of very large size, larger than the ☿ *max.*, but resembling it. Head finely longitudinally striate on the front, the striæ strongly divergent outwards above the vertex; the head above and the occiput covered with large shallow punctures over the striæ; mandibles coarsely longitudinally striate and pubescent; antennæ pubescent. Thorax: the pronotum transversely striate; the mesonotum, scutellum and abdomen smooth, polished, shining, with a few scattered punctures; metanotum and nodes of pedicel coarsely transversely rugose; legs very slender; wings brownish hyaline. For the rest the characters of the genus.

♂. Head anteriorly irregularly sculptured and opaque, posteriorly smooth and shining, with a few vague irregular striæ and punctures; thorax on the sides, the metanotum and the nodes of the pedicel more or less irregularly rugose, the remainder of the thorax and abdomen smooth, polished and shining. Legs long and slender, wings as in the ♀. For the rest the characters of the genus.

Length, ☿ ☿ 4–10; ♀ 14; ♂ 10 mm.

Hab. The North-west Himalayas, Dharmsála (*Sage*); the Tons Valley (*Smythies*); Quetta (*Nurse*).

The specimens kindly sent to me from Quetta by Maj. Nurse have the abdomen very closely and finely reticulate, opaque and not shining.

Genus HOLCOMYRMEX.

Atta, pt., *Roger, Berl. ent. Zeit.* vi (1862), p. 259. ☿.
Holcomyrmex, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 671, ☿.

Type, *H. scabriceps*, Mayr.

Range. Palæarctic and Indo-Malayan regions.

☿ *maj.* Head large, more or less rectangular, the sides straight; the occiput emarginate, but not deeply, the posterior lateral angles

rounded; mandibles very thick and massive, much curved, the masticatory margin obtuse, indistinctly dentate; clypeus narrow, produced posteriorly between the bases of the antennæ and rounded, anteriorly more or less irregular, transverse, with a carina on each side of a medial portion, the carinæ projecting and ending in blunt teeth; antennal carinæ short, wide apart, prominent; antennæ 12-jointed, the club of the flagellum indistinct, formed of the apical three joints; eyes rather small, circular, lateral, placed below the middle line of the head. Thorax massive, the pro-mesonotum forming one somewhat raised convexity; pro-mesonotal suture obsolete; meso-metanotal suture distinct; the thorax in profile slightly emarginate at the suture; metanotum comparatively long, the basal portion level and slightly flat above, the posterior lateral angles subtuberculate, the sides finely longitudinally carinate; the apex obliquely truncate; legs somewhat short and slender, the spur on the posterior tibiæ simple. Pedicel: the 1st node petiolate in front, viewed in profile higher than the 2nd, subtriangular, conical and rounded at the top; 2nd subglobose, as broad as long, attached to the abdomen by the whole of its posterior face; abdomen broad, rather flat, truncate anteriorly, the 1st segment covering more than half the whole length.

☿ *min.* Very similar, smaller, with proportionately a much smaller head, the mandibles not so thick and massive, tridentate.

♀. Very large; head not enlarged, proportionately shorter and broader, without the mandibles broader than long; mandibles, clypeus, antennal carinæ, and antennæ as in the ☿ *maj.*; ocelli present. Thorax massive; pronotum vertical, suppressed underneath the long, broad, somewhat gibbous mesonotum; scutellum large, rounded posteriorly; the basal portion of metanotum very short and sloping, but distinct, apical portion truncate; legs as in the ☿ *maj.*; wings broad and ample, fore wing with one long cubital and one short nearly square discoidal cell. Pedicel as in the ☿ *maj.*; abdomen rather massive, about two and a half times as long as broad and slightly truncate, anteriorly rounded and convex above.

♂. Head very small, eyes and ocelli very large and prominent; mandibles broad, triangular, with a distinct dentate masticatory margin, clypeus obscurely bicarinate; antennæ 13-jointed, the scape very short, shorter than the 2nd joint of the flagellum. Thorax massive, smaller than but similar to that of the ♀; metanotum longer, the apex subconcave; legs and wings as in the ♀. Pedicel similar to that of the ♀; abdomen narrower, posteriorly subacute.

The species of this genus are vegetarians and harvesters, like the species of *Messor*, to which they are very closely allied. *H. criniceps* was fairly common in the Pegu Yoma in Burma, and one very populous nest, which was close to some paddy-fields near a Forest reserve, I had under observation, off and on, for over two years. Regularly beaten tracks radiated from it to the paddy-

fields, and all day long a double stream of large, intermediate and small workers could be seen during the hot weather and on fine days, in the breaks in the rains, going empty and returning laden with grass-seeds or paddy. *Holcomyrmex* moves very slowly, but is dogged and persevering. I can confirm Mr. Wroughton's observation as to these ants leaving a white track across the rocks that their road happens to traverse. An interesting account of *Holcomyrmex scabriceps* is given by Mr. Rothney in the 'Transactions of the Entomological Society of London,' 1889, p. 367.

Key to the Species.

a. Clypeal teeth present.
- *a'.* Head entirely striate . . . . *H. scabriceps*, p. 282.
- *b'.* Anterior half or anterior one-third only of head striate.
  - *a².* Posterior half or two-thirds of head finely, closely, but not densely punctate . . . . . . *H. criniceps*, p. 282.
  - *b².* Posterior half or two-thirds of head smooth, polished and shining . . . . *H. glaber*, p. 284.

b. Clypeal teeth entirely absent . . . . *H. muticus*, p. 284.

320. **Holcomyrmex criniceps**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 672, ☿.

☿ *maj.* Resembles in colour *H. scabriceps*, but seems to me more variable. Some specimens have the head and thorax dark chestnut-brown or even black, and the abdomen dark red. Between these latter and specimens with the head and thorax light ferruginous and abdomen black, nearly all gradations can be found. Differs from *H. scabriceps* in the head being striate only anteriorly; from about the middle of the head upwards it is somewhat distantly punctured, more densely so at the sides, the cheeks below being striate. Thorax: the pro-mesonotum finely longitudinally striate, the striæ curving at the sides, the sculpture being distinctly finer and less rugose than in *H. scabriceps*; the basal portion of the metanotum shorter than the pro-mesonotum, finely transversely striate; the obtuse triangular tubercles at the posterior lateral angles of the metanotum distinctly larger than in *H. scabriceps*; legs as in that species, but proportionately a little shorter. Pedicel and abdomen as in the genus.

☿ *min.* Closely resembles the ☿ *maj.*, much smaller, the head proportionately rather large, the thorax more finely sculptured, the striæ on the anterior portion of the head almost obsolete.

Length, ☿ ☿ 3·5–5·5 mm.

Hab. Western India (*Wroughton*); Southern India (*Rothney*); Ceylon (*Yerbury*); Burma, Pegu Yoma (*Allan & Bingham*).

321. **Holcomyrmex scabriceps**, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 672, ☿.

☿ *maj.* Head, thorax and pedicel reddish ferruginous: the

antennæ, legs and posterior node infuscate, the abdomen dark brown; head very closely and finely longitudinally striate; thorax and the nodes of the pedicel rather more coarsely transversely rugose-striate; abdomen smooth. Pilosity very sparse, soft and somewhat long on the scape of the antennæ and on the tibiæ of the legs, adjacent and oblique. Head rectangular, longer than broad, the sides straight, the posterior lateral angles rounded; mandibles with a few coarse striæ at base; head posteriorly slightly emarginate and with a medial impressed line from the middle of the emargination to below the vertex. Thorax: the pro-mesonotum narrower than the head, rounded anteriorly and above; the basal portion of the metanotum nearly as long as the pro-mesonotum, the apex above medially subsulcate with the lateral angles more or less carinate, the posterior face of the metanotum obliquely truncate; legs slender, moderately long. Pedicel and abdomen as in the genus.

☿ *min.* Closely resembles the ☿ *maj.*, but is of course very much smaller; proportionately to the large pro-mesonotum, the basal portion of the metanotum is shorter than in the ☿ *maj.* The colour varies, some specimens have the head fuscous.

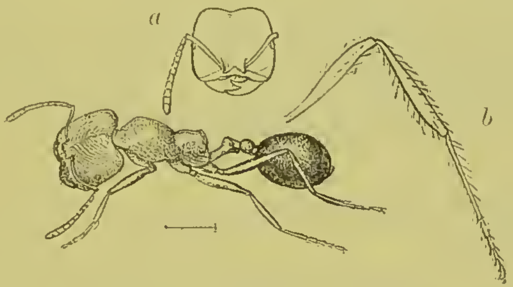

Fig. 84.—*Holcomyrmex scabriceps*, ☿. *a*. Head from front; *b*. Leg.

♀. Head deep red; thorax, pedicel and abdomen more or less dark brown or black, in places with reddish tinge. Head finely, densely punctate granulate; thorax and abdomen smooth and shining, some vague transverse striæ on the metanotum posteriorly, and the nodes of the pedicel opaque, granulate; wings light flavo-hyaline. For the rest the characters of the genus.

♂. Head and abdomen black; thorax and pedicel chestnut-brown, with the borders of the articulations yellowish; antennæ pale yellow; legs brown, tibiæ and tarsi dull yellow. Head opaque, rugulose; thorax entirely, pedicel and abdomen smooth and shining. For the rest the characters of the genus.

Length, ☿ ☿ 3·5–7; ♀ 12; ♂ 7 mm.

Hab. Distributed irregularly throughout India from the Punjab to Cochin; not recorded from Ceylon, Assam, or Burma.

Dr. Forel describes (Rev. Suisse Zool. x, 1902, p. 220) a variety named by him *H. crinicipito-scabriceps*, intermediate between this species and *H. criniceps*, Mayr. This latter, however, occurs in Burma, where I failed to procure *H. scabriceps*.

322. **Holcomyrmex glaber**, *André, Hym. Eur.* ii (1883), p. 345, foot-note.

☿ *maj.* Varying from brownish red to brownish black; the mandibles, flagellum of the antennæ and legs, sometimes the metanotum also, yellowish red to chestnut-red; head, pro- and mesonotum very smooth, polished and shining; the head anteriorly and the mandibles more or less finely longitudinally striate; the metanotum above finely transversely striate, the sides minutely but densely rugulose, opaque; pedicel finely rugulose and opaque also; pilosity more or less abundant (on the other two species almost entirely and in some specimens quite wanting); pubescence very sparse, except on the antennæ and tarsi. Head, thorax, pedicel and abdomen typical of the genus.

☿ *min.* Smaller, with the head somewhat smaller in proportion, generally lighter in colour, the flagellum of the antennæ and the legs being a clear reddish yellow. Sculpture and pilosity as in the ☿ *maj.*

Length, ☿ ☿ 3·5–7·5 mm.

Hab. Recorded so far from Western and Southern India, Ceylon, and Burma.

This is a race barely separable from *H. criniceps*, Mayr. Dr. Forel has described (*l. c.*) a variety under the name *H. glabro-criniceps*, intermediate between the two species. Also var. *clarus*, altogether of a yellowish red, more or less clear, with the abdomen brown, red at base, and the antennæ and legs clear yellow. This latter variety has been recorded also from the Siwaliks.

323. **Holcomyrmex muticus**, *Emery, Ann. Mus. Civ. Gen.* xxv (1887), p. 457, ☿.

" ☿ *maj.* Piceous, the mandibles and legs obscurely ferruginous, the tibiæ and flagellum of the antennæ paler; pilosity sparse; shining; metanotum opaque. Head smooth, sparsely punctured; the front, cheeks and occiput lightly longitudinally striate; clypeus very smooth, without the usual teeth; mandibles cribrate-sulcate, shining; the 8th joint of the flagellum of the antennæ scarcely shorter than the following joints. Thorax: the pronotum and mesonotum above distinctly punctate and longitudinally rugulose, slightly shining; the sides of the meso- and metanotum densely punctured, the latter even obsoletely transversely rugose, posteriorly lightly impressed, in the middle without teeth or elevated carinæ. Nodes of the petiole very finely punctate. Abdomen smooth.

"*Length*, ☿ *maj.* 5–6 mm." (*Emery.*)

Hab. " Upper Burma, Minhla (*Comotto*)."

This species is entirely unknown to me, but apparently, except for the absence of the clypeal teeth, is almost identical with forms of a species I have always looked upon as *H. criniceps*, Mayr, collected at various localities in Burma.

Genus TRIGONOGASTER.

Trigonogaster, *Forel, Ann. Soc. Ent. Belg.* xxxiv (1890), *C. R.* p. cviii.

Type, *T. recurvispinosa*, Forel.

Range. Indo-Malayan region.

☿. Elongate, narrow. Head viewed from the side truncate anteriorly, longer than broad; mandibles narrow, the masticatory margin armed with 4 teeth; maxillary palpi 5-, labial palpi 3-jointed; clypeus vertical, strongly vaulted and convex, forming an angle with the portion of the front above it, and furnished with two longitudinal carinæ; the antennal carinæ short, prominent; antennæ 11-jointed, the last three joints incrassate, forming a club as in the genus *Phidole*; eyes lateral and a little to the front. Thorax elongate, broad anteriorly, the pro- and mesonotum forming a single convexity; the pro-mesonotal suture visible as a line; the metanotum depressed, laterally slightly compressed; the meso-metanotal suture very distinct, the basal portion of the metanotum armed posteriorly with two strong recurved spines, the apical portion oblique, nearly vertical; legs moderately slender and long. Pedicel with the two nodes close together; the 1st node with a long thick pedicel anteriorly, and squamiform, somewhat conical, above; the 2nd node broader than the 1st node and broader than long, rounded in front, transverse posteriorly, articulated to the abdomen by the whole of its posterior face; abdomen viewed from the side triangular, flat above, the apex of the triangle below.

324. **Trigonogaster recurvispinosa**, *Forel, Ann. Soc. Ent. Belg.* xxxiv (1890), *C. R.* p. cix.

☿. Head and thorax tawny-olive; abdomen dull yellowish. Head, thorax and abdomen extremely finely and closely punctured, opaque; pilosity very sparse, only a few scattered pale erect hairs

Fig. 85.—*Trigonogaster recurvispinosa*, ☿.

on the front and on the abdomen. Head rectangular, widely and very slightly emarginate posteriorly; mandibles striate, slightly shining. For the rest the characters of the genus.

Length, ☿ 2 mm.

Hab. Western India (*Wroughton*).

Genus CARDIOCONDYLA.

Cardiocondyla, *Emery, Ann. Acc. Asp. Nat., Naples, Era* 2, ii (1869), p. 20.

Emeriya, *Forel, Ann. Soc. Ent. Belge,* xxxiv (1890), *C. R.* p. cx.

Type, *C. elegans*, Emery, from Italy.

Range. Palæarctic, Ethiopian, and Indo-Malayan regions.

☿. Head broadly oval; mandibles rather broad, armed with 5 teeth; clypeus obliquely sloping downwards, slightly convex, anteriorly rounded; frontal area depressed; antennæ 12-jointed, the club proportionately incrassate and formed of the apical 3 joints; antennal carinæ short but prominent; eyes oval, lateral (in Indian species below the middle line of the head); no ocelli. Thorax short and stout, the pro-mesonotal suture obsolete above, the meso-metanotal distinctly impressed; metanotum posteriorly armed with two stout spines (very short and thick in Indian species); legs elongate, slender; tibiæ without calcaria. Pedicel very long; the 1st node with cylindrical petiole, long in front, short posteriorly, node itself from above oval; 2nd node in the Indian species broadly cordate, usually very much broader than long; abdomen oval, lightly truncate or emarginate in front, the basal segment remarkably long.

"♀. Head as in ☿ but shorter; ocelli three on the vertex, indistinct. Thorax elongate, the pronotum distinctly forming part of the dorsum; the two metanotal spines thick. Pedicel and abdomen as in the ☿: wings wanting." (*Emery.*)

♂. "Mandibles very long, very narrow, without a terminal margin, nearly straight along the basal half, curved along the apical half, terminating in a long acute point, a little enlarged and depressed towards their middle, constricted near their base, without trace of teeth. Between the mandibles is a wide space similar to that in the ♃ of *Myrmecocystus bombycinus.* Clypeus bicarinate, emarginate, and with a deep groove between the carinæ, the groove prolonged up the front between the antennal carinæ up to the middle of the vertex. No ocelli. Head widened and somewhat rounded posteriorly, constricted in front; it has, however, a posterior margin. Eyes rather small, situated in the anterior third of the head. Frontal carinæ very short. Antennæ with 11 joints; the last very broad and thick, forming the club of the flagellum. The scape does not nearly reach the posterior margin of the head. The pronotum has distinct shoulders and anteriorly, towards its articulation with the head, is formed into a ladder-like slope. The mesonotum is short and very broad, laterally the margins project triangularly in form of a thick festoon. Metanotum armed with two short spines. Pedicel as in the genus *Cardiocondyla* *. The 1st joint is petiolate in front and has a

* Dr. Forel mistook a ♂ *Cardiocondyla* for a ☿, which he was unable to identify. For this supposed ☿ he proposed the genus *Emeryia.* Subsequently he discovered that this ☿ was really an ergatoid ♂, and belonged to the genus *Cardiocondyla.* It is no wonder therefore that the pedicel should be "as in the genus *Cardiocondyla.*" I have quoted Dr. Forel's description before he found out his mistake.

compressed node longer than broad; the 2nd joint is broad, broader than long, constricted and concave in front, a little less constricted and convex posteriorly, rounded at the sides, flattened above, furnished below with an obtuse tooth. Abdomen truncate anteriorly." (*Forel.*)

This genus is remarkable as possessing ergatoid males.

Key to the Species.

a. Head posteriorly rounded, with no distinct posterior margin .... *C. nuda*, p. 287.
b. Head posteriorly transverse, with a distinct posterior margin.
  a'. Node on second joint of pedicel distinctly much broader than long .... *C. wroughtoni*, p. 287.
  b'. Node on second joint of pedicel narrower, as long as broad .... *C. parvinoda*, p. 288.

325. **Cardiocondyla nuda**, *Mayr* (Leptothorax), *Sitzungsb. Akad. Wiss. Wien*, liii (1866), 1 *Abth.* p. 508, ☿.

☿. Head, thorax, legs and pedicel red, inclining to orange on the thorax and pedicel and shaded with dark fuscous on the front of the head; antennæ and legs orange-yellow; abdomen jet-black. Head, thorax and pedicel finely granulate, subopaque: abdomen highly polished and shining. Head massive, as long nearly as the thorax, oval, very convex in front; mandibles broad, very minutely punctured; clypeus very narrow; antennæ elongate, the apical three joints of the flagellum fuscous. Thorax distinctly narrower than the head, the anterior angles of the pronotum visible but rounded; metanotum cubical, the basal portion long, about twice as long as the truncate face of the apical portion. Pedicel about half the length of the thorax, the posterior node about three times as broad as the anterior node; abdomen oval.

Length, ☿ 2·5–3 mm.

Hab. Sikhim (*Bingham*); Bengal, Barrackpore (*Rothney*): Ceylon (*Green*).

326. **Cardiocondyla wroughtoni**, *Forel* (Emeriya), *Ann. Soc. Ent. Belg.* xxxiv (1890), *C. R.* p. cxi, ♂.

☿. Head, thorax, legs and pedicel dull brick-red, abdomen

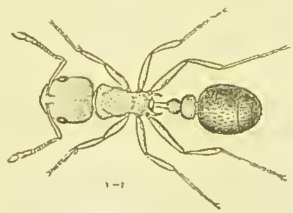

Fig. 86.—*Cardiocondyla wroughtoni*, ☿.

black, sometimes entirely dark fuscous red, darkest on the head and abdomen; pilosity entirely wanting; pubescence microscopic,

visible only in certain lights on the head, legs and abdomen. Head and thorax minutely and very closely reticulate-punctate, subopaque, the nodes of the pedicel above and the abdomen smooth, polished and shining. Head with a distinct posterior margin, rectangular, a little longer than broad. Thorax as in *C. nuda*, but the metanotal spines longer, more slender and acute. Pedicel as in *C. nuda*, the 2nd node proportionately not quite so broad, but still much broader than long; abdomen as in *C. nuda*.

"♂. Characters those of the genus. Mandibles smooth and shining. Head for the most part smooth and shining, with very large deep punctures, widely scattered and piligerous. . . . On the front these punctures are more abundant and accompanied with fine short striæ. Back of the thorax submargined. Pro-mesonotal suture nearly obsolete; meso-metanotal suture very deep, but there is no constriction between the meso- and metathorax. Basal face of the metanotum longer than broad, more or less horizontal. Spines rather short and obtuse. Thorax irregularly reticulate-punctate and somewhat opaque. The lateral expansions of the mesonotum give it a peculiar aspect. Abdomen and pedicel somewhat smooth and shining, very finely and sparsely punctured. . . . The whole surface covered with an abundant rather long pale yellow pubescence, which, however, does not form a distinct pile or nap. Pilosity almost entirely absent. Pale yellow testaceous. Mandibles reddish. Abdomen of a brownish yellow." (*Forel.*)

Length, ☿ 1·8; ♂ 1·7 mm.

Hab. Western India, Poona (*Wroughton*).

327. **Cardiocondyla parvinoda**, *Forel, Rev. Suisse Zool.* x (1902), p. 213.

☿. Resembles *C. nuda*, Mayr, but the head, thorax and pedicel are of a lighter duller red, the antennæ and legs a paler shade of the same, and the abdomen shining castaneous. Head broader, with a distinct posterior margin; thorax and legs as in *C. nuda*; pedicel of the abdomen proportionately not so long, with the 1st node higher; the 2nd node much narrower, being as long as broad and not twice as broad as the 1st node; abdomen as in *C. nuda*.

Length, ☿ 2–2·2 mm.

Hab. Recorded so far from Western India only (*Wroughton*).

Subfamily DOLICHODERINÆ.

The species belonging to this subfamily can be distinguished at a glance from the *Ponerinæ* on the one hand by there being no constriction between the 1st and 2nd segment of the abdomen, and on the other hand from the *Camponotinæ* by the anal aperture being transverse, and not circular nor ciliated. The head is short and

broad; the thorax robust, the metanotum often compressed and raised (*Dolichoderus*) or spinous (*Aneuretus*); pedicel 1-jointed, the node placed closer to the abdomen than to the thorax, sometimes inclined anteriorly, and often impinging on the front of the abdomen, which has a hollow anteriorly for its reception; abdomen generally gibbous in front; sting not modified, but only in one genus (*Aneuretus*) exserted.

Key to the Genera.

A. Metanotum not bispinous.
  a. Clypeus with oval side-processes overlapping the base of the mandibles on each side .... LIOMETOPUM, p. 289.
  b. Clypeus without such side-processes.
    a'. Base of the abdomen not gibbous, not overhanging the pedicel.
      *a*². Metanotum laterally compressed, cuneiform, with a basal face more or less horizontal, and an apical face truncate, vertical, often concave, the former passing into the latter by a sharp angle .... DOLICHODERUS, [p. 291.
      *b*². Metanotum not laterally compressed, not cuneiform, rounded; its basal face passing into the obliquely truncate sloping apical face by a more or less rounded curve. ...... IRIDOMYRMEX, p. 297.
    b'. Base of the abdomen gibbous, overhanging the pedicel.
      *a*². Anal orifice apical................ TECHNOMYRMEX, [p. 300.
      *b*². Anal orifice inferior, not apical.
        *a*³. Pedicel with a small, low, but distinct node inclined obliquely forwards .... BOTHRIOMYRMEX, [p. 305.
        *b*³. Pedicel without a distinct node .. TAPINOMA, p. 303.
B. Metanotum bispinous .... ANEURETUS, p. 290.

Genus LIOMETOPUM.

Formica, pt., *Panzer, Faun. Ins. Germ.* v (1798), p. 54, pl. 2, ♂.
Hypoclinea, pt., *Roger, Berl. ent. Zeit.* iii (1859), p. 241, ♂.
Liometopum, *Mayr, Europ. Form.* 1861, p. 38.

Type, *L. microcephalum*, Panz., from Europe.
Range. Both hemispheres.

☿. Head with the mandibles triangular, broader posteriorly than in front; mandibles broad, the masticatory margin with 8 or 10 teeth, the apical tooth long acute and curved; clypeus somewhat flat, triangular, rounded posteriorly and extending to between the antennal carinæ, laterally it extends in little oval processes over the basal portion of the mandibles, its anterior margin transverse; antennal and clypeal hollows coalescent; frontal area not clearly defined; antennal carinæ short, wide apart, parallel, slightly

curved outwards; antennæ 12-jointed, stout, planted immediately behind the posterior margin of the clypeus; eyes placed laterally and a little forward in the middle line of the head; ocelli (in the Indian species) wanting. Thorax: the pro-meso- and meso-metanotal sutures well-marked, but in profile the line of the thorax nowhere emarginate, the pro-, meso- and metanotum forming a slight curve to the apex of the last, which is oblique but not truncate; legs rather long and slender, the calcaria pectinate, claws simple. Node of the pedicel oval, not inclined, erect; abdomen broadly oval, not gibbous in front.

♀. Head somewhat broader than the thorax; the mandibles, clypeus, antennæ, and calcaria as in the ☿; the frontal area in form of an equilateral triangle, more distinct. Thorax depressed, slightly flat. Front wing with two closed cubital cells.

♂. Head much narrower than the thorax; mandibles and clypeus as in the ☿; antennæ 13-jointed, the first three joints of the flagellum longer than the scape; the frontal area not distinct. The thorax massive; the mesonotum flat, not overhanging the pronotum. Node of the pedicel erect, rounded above. External genitalia large and prominent.

Only a single species of this genus has so far been recorded from within our limits.

328. **Liometopum lindgreeni**, *Forel, Ann. Soc. Ent. Belg.* xlvi (1902), p. 293, ☿.

☿. Head, thorax, legs, nodes of pedicel and base of abdomen reddish brown; rest of the abdomen dark brown, the margins of the segments pale. Pilosity rather sparse, short and soft, pale yellowish in colour, somewhat more abundant on the abdomen than on the head and thorax; pubescence pale, very dense and decumbent, giving with the fine, close, minute reticulate punctate sculpture an opaque appearance to the whole insect. For the form of the head, thorax, &c. see the characters of the genus.

Length, ☿ 4·5–5 mm.

Hab. Assam, Dibrugarh (*Lindgreen*); Burma, Bhamo (*Bingham*).

Genus ANEURETUS.

Aneuretus, *Emery, Ann. Soc. Ent. Fr.* lxii (1893), p. 241.

Type, *A. simoni*, Emery, from Ceylon.

Range. Recorded so far only from Ceylon.

☿. Head cordate. Clypeus large, subtriangular, anteriorly medially emarginate, posteriorly produced between the bases of the antennæ, and with clypeal hollows. Antennal carinæ wide apart, low, slightly divergent, nearly straight. Eyes depressed, ocelli wanting. Mandibles triangular, the masticatory margin denticulate. Antennæ 12-jointed, slender, with an elongate scape and filiform flagellum, gradually thickening towards the apex, but without a distinct club, the apical joint subequal to the two preceding joints. Thoracic sutures distinct, metanotum bispinous.

Pedicel elongate, cylindrical, posteriorly with a minute globose node. Abdomen almost entirely without a constriction between the basal two joints. Legs slender, calcaria slightly denticulate, claws simple. (*After Emery.*)

329. **Aneuretus simoni**, *Emery, Ann. Soc. Ent. Fr.* lxii (1893), p. 242, ☿.

"☿. Testaceous, subopaque, the abdomen more shining, pubescent and sparsely pilose; head cordate posteriorly, widely emarginate, very finely and lightly reticulate, the mandibles somewhat smooth, the apex tridentate and in addition a little

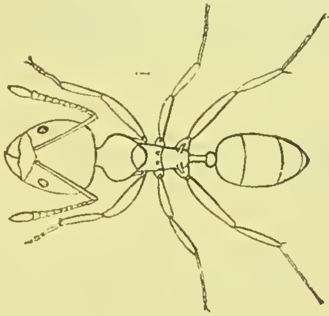

Fig. 87.—*Aneuretus simoni*, ☿. (After Emery.)

irregularly denticulate; the scape of the antennæ extending beyond the top of the head; joints 5–10 of the slender flagellum thickening gradually, all the joints longer than broad; the promesonotal suture distinct, meso-metanotal suture deep and broadly impressed, pronotum very lightly longitudinally striate, metanotum transversely striate; the scutellum elevated, metanotum transversely rugose-striate, the base slightly gibbous, posteriorly armed with long divergent spines; pedicel with a small round node having anteriorly an elongate petiole." (*Emery.*)

Length, ☿ 1·8 mm.

Hab. Ceylon.

Genus **DOLICHODERUS.**

Formica, pt., *Linn. Syst. Nat.* ed. 10, i (1758), p. 581.
Dolichoderus, *Lund, Ann. Sc. Nat.* xxiii (1831), p. 130.
Hypoclinea (*Först.*), *Mayr, Verh. zool.-bot. Ges. Wien,* v (1855), p. 377.

Type, *D. attelaboides*, Lund, from Brazil.

Range. Both hemispheres.

☿. Head short, generally almost as broad as long, the front and the cheeks very convex; in the Indian species not constricted into a neck posteriorly; mandibles triangular, very broad at the masticatory margin, which is straight and furnished with numerous (10–12) small teeth; clypeus very slightly convex in all the species,

its anterior margin transverse or slightly and widely emarginate; antennal carinæ always short and wide apart; antennæ 12-jointed, stout, the scape long; eyes placed somewhat to the front and above the middle line of the head. Thorax short, laterally compressed and slightly constricted about the middle, the sutures very distinctly marked; the pronotum convex or flat; the mesonotum short and raised above the level of the pronotum, often longitudinally sulcate. Viewed from the side, the thorax is deeply and very widely emarginate at the meso-metanotal suture; the metanotum is triangular, laterally compressed, with a basal portion flat or slightly inclined to the front, and a truncate apical face often concave and curved inwards: the legs are long and robust. Pedicel 1-jointed, with a conical or scale-like node low and inclined forwards; abdomen broadly oval, never produced anteriorly or overhanging the pedicel.

Key to the Species.

A. Mesonotum not longitudinally sulcate above.
- *a.* Of large size: length over 5 mm.; head, thorax, legs, node of pedicel and basal two abdominal segments black; abdomen posteriorly reddish yellow . . . . . . *D. sulcaticeps*, p. 293.
- *b.* Much smaller: length under 3 mm.; head, thorax and node of pedicel reddish brown; abdomen and legs yellow . . . . . . *D. burmanicus*, p. 293.

B. Mesonotum more or less distinctly longitudinally sulcate above.
- *a.* Head, thorax and abdomen with abundant fine silky pubescence, but entirely without erect hairs.
  - *a'*. Head and abdomen brownish; thorax and legs yellow or reddish yellow . . . . *D. feæ*, p. 294.
  - *b'*. Head, thorax and abdomen fuscous brown or black; legs dark castaneous red . . . . *D. fuscus*, p. 294.
- *b.* Head, thorax and abdomen more or less furnished with erect hairs.
  - *a'*. Head finely punctured, pubescent and opaque; thorax very coarsely rugose . *D. bituberculatus*, p. 295.
  - *b'*. Head smooth and shining, slightly pubescent but not opaque; thorax less coarsely punctured.
    - *a*². Head and thorax reddish yellow; abdomen black . . . . *D. taprobanæ*, p. 296.
    - *b*². Head, thorax and abdomen concolorous.
      - *a*³. Basal portion of metanotum distinctly longer than the apical truncate portion; length over 3 mm. . . . . *D. affinis*, p. 296.
      - *b*³. Basal portion of metanotum distinctly shorter than the apical truncate portion; length under 3 mm. . . . . *D. moggridgei*, p. 297.

330. **Dolichoderus sulcaticeps,** *Mayr* (Hypoclinea), *Verh. zool.-bot. Ges. Wien*, xx (1870), p. 957, ☿; *Forel, Bomb. N. H. Soc.* ix (1895) p. 462, ☿.

☿. Black, highly polished and shining, the apical five joints of the flagellum of the antennæ and the apical four segments of the abdomen bright reddish yellow; the mandibles brownish red; head, thorax and abdomen covered with fairly abundant erect pale hairs. Head from the front with the mandibles triangular, the posterior margin slightly convex, nearly transverse, the lateral angles rounded, the front with a deep furrow reaching down to between the eyes; mandibles triangular, somewhat short and very broad and dentate along the masticatory margin: clypeus slightly convex, its anterior margin transverse; antennæ with the scape thickening towards the apex; eyes placed high upon the sides of the head. Thorax high, the pronotum rounded and convex above, the emargination between the meso- and metanotum deep, the latter convex and rounded above, flat and longitudinally concave at apex; legs long and robust. Node of the pedicel viewed from the side conical, triangular; abdomen short and broadly oval, very convex above.

Length, ☿ 5·5–6·5 mm.

Hab. Burma (*Fea*); Tenasserim (*Bingham*), extending into the Malayan subregion.

Some specimens have the yellow on the abdomen extending up the sides to the basal segment.

331. **Dolichoderus burmanicus,** sp. nov.

☿. Head, thorax and node of the pedicel reddish brown; the mandibles and antennæ yellowish brown; legs and abdomen yellow in striking contrast; the whole insect densely pilose, and minutely and sparsely pubescent. Head with the mandibles from

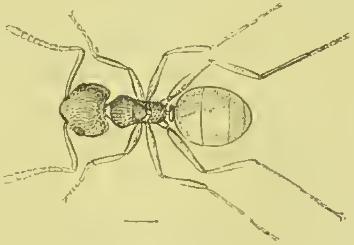

Fig. 88.—*Dolichoderus burmanicus*, ☿.

the front elongately triangular, very convex; mandibles very broad and straight at the masticatory margin, furnished with 10–12 small acute teeth, punctured and pilose; clypeus broad, slightly convex, transverse anteriorly, with the margin fringed with longish hairs; frontal area small but distinct, triangular;

antennæ stout, the scape long, extending beyond the top of the head; antennal carinæ short, wide apart, parallel; eyes posterior to the transverse middle line of the head. Thorax coarsely cribrately punctured, rugose; the pronotum rounded above, slightly convex; the meso-metanotal suture distinct; the mesonotum from above circular, raised slightly above the pronotum, slightly convex, not sulcate; meso-metanotal emargination deep, the basal portion of the metanotum longer than the truncate apical portion, convex, not flat, the apical portion vertical, flat, not concave; legs long and rather slight, pubescent and sparsely pilose. Node of the pedicel flat, broader than long; abdomen short and broad, globose, very convex above.

Length, ☿ slightly under 3 mm.

Hab. Upper Burma at elevations above 4000 ft. (*Bingham*).

I found this pretty species not uncommon at Taunggyi, Southern Shan States, and in the Ruby Mines district. It had the characteristic pleasant scent given out by many of the species of the genus.

332. **Dolichoderus feæ**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 509, pl. xi, fig. 21, ☿.

☿. Head with the antennæ and abdomen brownish; thorax and legs bright yellow. Head, thorax and abdomen covered with a thin sericeous silvery pubescence, which is somewhat dense on the abdomen above; pilosity entirely wanting. Head similar in shape to that of *D. sulcaticeps*, but proportionately longer and not so broad posteriorly, finely and closely reticulate punctate; a long longitudinally impressed line from the vertex to between the eyes, the latter placed lower down on the sides of the head than in *D. sulcaticeps*; mandibles broadly triangular, finely and closely punctured, opaque; clypeus convex, anteriorly transverse. Thorax laterally compressed, irregularly and somewhat coarsely punctured; pronotum above flat, slightly concave, margined anteriorly and on the sides; mesonotum longitudinally sulcate; metanotum viewed from the side subtriangular, the meso-metanotal emargination deep, the basal portion flat, slightly concave above, sulcate posteriorly, the apical portion concave, with a very distinct curve inwards. Node of the pedicel laminate, somewhat thick and very slightly convex anteriorly; abdomen oval, proportionately much longer than in *D. sulcaticeps*.

Length, ☿ 5–6 mm.

Hab. Sikhim, and throughout the whole of Burma and Tenasserim (*Fea, Bingham*).

333. **Dolichoderus fuscus**, *Emery*.

Dolichoderus feæ, *race* fuscus, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 509; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), pp. 463 & 465.

☿. Resembles *D. feæ* generally in form and sculpture, in being

entirely destitute of erect hairs, and in having a more or less abundant fine silky pubescence, most dense on the abdomen. Differs entirely in colour, is also larger and more stoutly built. Head, thorax and abdomen black or dark fuscous brown, the masticatory margin of the mandibles broadly yellow, and also the apical joint of the flagellum of the antennæ, the lower part of the head and the clypeus shaded with dark castaneous red, the legs throughout of that colour. Head very finely and closely reticulate-punctate, subopaque; thorax irregularly punctured and wrinkled, longitudinally and obliquely striate on the sides. Node of the pedicel and the abdomen proportionately broader than in *D. feæ*.

Length, ☿ 6·5–7 mm.

Hab. Throughout Burma and Tenasserim (*Fea*, *Bingham*).

331. **Dolichoderus bituberculatus**, *Mayr* (Hypoclinea), *Verh. zool.-bot. Ges. Wien*, xii (1862), p. 705, ☿; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 464, ☿.

☿. Head and thorax black, legs dark reddish brown, node of the pedicel and abdomen dark brown, the latter posteriorly nearly black; head, thorax and abdomen covered with sparsely scattered erect black hairs and a somewhat abundant fine silky pale pubescence, very dense on the head, thorax and legs. Head without the mandibles broadly oval, the cheeks and front strongly convex; mandibles triangular, the masticatory margin broad, the teeth minute; clypeus broad, slightly convex, its anterior border

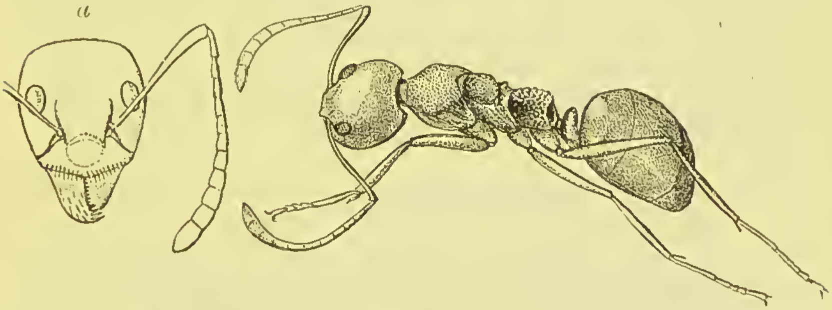

Fig. 89.—*Dolichoderus bituberculatus*, ☿. *a*. Head from front.

very slightly and widely emarginate; eyes very flat, not prominent, placed only slightly above the middle transverse line of the head. The whole head densely punctured and opaque. Thorax very coarsely cribrately punctured and wrinkled; the pronotum more or less flat and margined anteriorly; the mesonotum longitudinally sulcate, the sides raised into tubercles more marked in some specimens than in others, the basal and the truncate inwardly curved and concave apical portions of the metanotum subequal, the sides of the metanotum flat, smooth, margined

above and posteriorly. Node of the pedicel smooth and shining, thicker above than at base, a little broader than thick; abdomen shining, broad at base, not so convex above as in *D. sulcaticeps* and somewhat pointed at apex.

Length, ☿ 3–3·5 mm.

Hab. Sikhim (*Möller*), Western India (*Wroughton*); Burma, Tenasserim (*Fea*, *Bingham*); extending into the Malayan subregion.

335. **Dolichoderus taprobanæ**, *Smith* (Formica), *Cat.* vi (1858), p. 13, ☿; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 464, ☿.
Hypoclinea gracilipes, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 658, ☿.
Dolichoderus semirufus, *André, Rev. d'Entom.* vi (1887), p. 288, ☿.

☿. Head, thorax and pedicel brownish red, legs paler, abdomen black; head, thorax and abdomen with a few scattered erect, short, soft pale hairs and a thin sericeous pale pubescence. Head with the mandibles subtriangular, broader posteriorly than in front, smooth and shining; cheeks convex; mandibles, clypeus, antennal carinæ and antennæ as in all the Indian species of the genus; eyes placed more anteriorly than in *D. feæ* or *D. sulcaticeps*. Thorax laterally compressed, the pronotum slightly convex, anteriorly margined; mesonotum longitudinally sulcate and bigibbous, the meso-metanotal emargination deep and well-marked; the metanotum with the basal and apical portions subequal, the former horizontal, the latter truncate and slightly concave; legs robust. Node of the pedicel low, slightly convex in front, transverse above; abdomen rather massive, broadly oval.

Length, ☿ 2·5–3·3 mm.

Hab. Throughout our limits.

Varieties have the abdomen reddish brown and the legs longer; var. *gracilipes*, Mayr.

336. **Dolichoderus affinis**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 508, pl. xi, fig. 20, ☿; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 464, ☿.

☿. Reddish brown to dark brown, the mandibles, antennæ and legs lighter in colour; head, thorax and abdomen sparsely pilose and pubescent. Head shining, very finely closely punctate, longer than broad; cheeks and front very convex; mandibles proportionately large, the apical tooth long, acute and slightly curved; clypeus, antennæ and eyes as in *D. bituberculatus*. Thorax: the pronotum slightly flat and anteriorly margined; the mesonotum raised, somewhat flat, indistinctly medially sulcate; metanotum slightly convex and sloping from back to front, its apical portion truncate and concave; the whole thorax irregularly but very distinctly punctured, wrinkled and sculptured, but not so coarsely as in *D. bituberculatus*; legs long, rather markedly pilose. Node of the pedicel inclined forward.

thick at base, transverse above; abdomen somewhat elongately oval, smooth and shining, very convex above.

Length, ☿ 3·5–4 mm.

Hab. Sikhim, up to 7000 ft. (*Möller*); Burma, Tenasserim (*Fea, Bingham*), and Siam (*Sigg*).

Var. *nigricans*, Emery, is very dark fuscous, almost black. Var. *glabripes*, Forel, is longer, more slender, and has the legs of a light yellowish red and comparatively smooth, without pilosity.

337. **Dolichoderus moggridgei**, *Forel, J. A. S. B.* lv, 2 (1886), p. 243, ☿; *id. Jour. Bomb. N. H. Soc.* ix (1895), p. 463, ☿.

☿. Brownish red, uniform, the mandibles, antennæ and legs a shade lighter. Head and abdomen shining, but very minutely and closely reticulate-punctate, sparsely pilose and pubescent; thorax more coarsely punctate and pilose, somewhat opaque. Head oval, as broad posteriorly as in front; the cheeks and front very convex; mandibles triangular, the outer and masticatory margins longer proportionately than in any other Indian species of the genus; clypeus and antennæ as in *D. feæ*, only the scape is proportionately longer and extends further beyond the top of the head. Thorax short and broad; the pronotum flat, margined anteriorly; the mesonotum much raised and not very distinctly longitudinally sulcate; the meso-metanotal emargination very deeply marked, the truncate apical portion of the metanotum long and flat, almost vertical; legs moderately long, robust, and sparsely pilose. Node of the pedicel inclined to the front, slightly convex anteriorly, flat posteriorly, its upper margin rounded; abdomen broadly oval, not very convex above.

Length, ☿ 2·3–2·5 mm.

Hab. Sikhim at 4000 ft. (*Möller*); Assam (*Long*).

I am a little in doubt whether I have rightly identified the above species.

Genus IRIDOMYRMEX.

Formica, pt., *Smith, Jour. Linn. Soc.* iii (1858), p. 137, ☿.
Acantholepis, pt., *Lowne, Entomologist,* ii (1865), p. 332, ♀.
Hypoclinea, pt., *Mayr, Verh. zool.-bot. Ges. Wien,* xx (1870), p. 959.
Iridomyrmex, *Mayr, Verh. zool.-bot. Ges. Wien,* xii (1862), p. 702.

Type, *I. detectus*, Smith, from Australia.

Range. Both hemispheres.

☿. Head triangular; mandibles very broad at the masticatory margin, armed with 7–8 teeth; clypeus triangular, slightly convex, posteriorly extending slightly up between the antennal carinæ, anteriorly transverse; antennal carinæ wide apart, short, parallel; antennæ long, the scape and flagellum both slightly clavate, the former extending beyond the top of the head; frontal area indistinct; eyes of moderate size, placed somewhat forward, about the transverse middle line of the head. Thorax slender, the pro- and

mesonotum subequal in length, the former moderately broad, convex, the latter viewed from the side somewhat cylindrical and sloping backwards from the pro-mesonotal suture, this latter and the meso-metanotal suture distinct; metanotum more or less raised, convex and gibbous, obliquely truncate posteriorly; legs long, robust, the calcaria pectinate, the claws simple. Node of the pedicel upright or slightly inclined forward; abdomen short, broadly oval, not produced anteriorly so as to overhang the pedicel.

Key to the Species.

a. Head viewed from the front not emarginate posteriorly.
- *a'.* Thorax in profile widely emarginate at the meso-metanotal suture .... *I. anceps*, p. 298.
- *b'.* Thorax in profile not emarginate at the meso-metanotal suture; meso- and metanotum level one with the other .... *I. glaber*, p. 299.

b. Head viewed from the front widely emarginate posteriorly .... *I. lævigatus*, p. 299.

338. **Iridomyrmex anceps**, *Roger* (Formica), *Berl. ent. Zeit.* vii (1863), p. 164, ☿; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), pp. 468 & 469, ☿.

☿. Head, thorax and abdomen dark castaneous brown, with a beautiful metallic refulgence in certain lights; antennæ very much and legs slightly paler reddish brown. Pilosity very sparse, confined to a few scattered pale hairs chiefly on the front of the head and apex of the abdomen. Pubescence fine and silky, tolerably

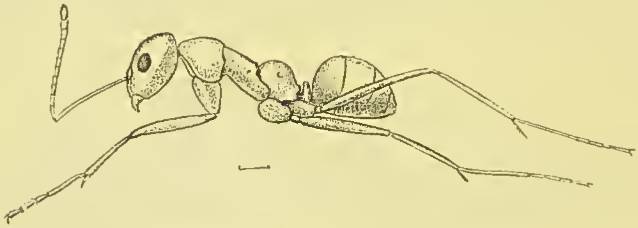

Fig. 90.—*Iridomyrmex anceps*, ☿.

abundant, especially on the abdomen. Head with the mandibles triangular, very much longer than broad, cheeks slightly convex; mandibles elongate, the masticatory and outer margins nearly equal; clypeus triangular, nearly flat, almost as high as broad; the front with a distinct but short vertical carina between the antennal carinæ; eyes placed laterally and a little forward, closer to the top of the head than to the anterior margin. Thorax elongate, narrow, the metanotum remarkably raised and forming

a round gibbosity somewhat similar to the shape of the metanotum in the genus *Myrmecocystus*. Node of the pedicel broader than long, slightly inclined to the front, flat anteriorly and posteriorly, as thick above as at base, and rounded above; abdomen broadly oval, only slightly convex above.

Length, ☿ 3·5–4·5 mm.

Hab. Spread through India except in the North-west Provinces and the Punjab; Ceylon (*Yerbury*, *Green*); Assam (*Smythies*); Burma, Tenasserim (*Fea*, *Bingham*); extending through the Malayan sub-region to Java.

The specimens from Sikkim are larger (4·5 mm.), and the specimens from Burma of a duller colour with very little or no refulgence. The latter variety has been separated as var. *watsoni*, Forel.

339. **Iridomyrmex glaber**, *Mayr* (Hypoclinea), *Verh. zool.-bot. Ges. Wien*, xii (1862), p. 705, ☿ ♂; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), pp. 467 & 468, ☿.

☿. Black, highly polished and shining, with, in certain lights, brilliant metallic refulgence, antennæ and legs castaneous brown; almost destitute of pilosity or pubescence. Head proportionately broader and with the sides more convex than in *I. anceps*; mandibles triangular, slightly convex, punctured and pilose; clypeus slightly convex, with the middle portion anteriorly flat; eyes placed lower down than in *I. anceps*. Thorax comparatively broad, laterally slightly compressed, the pro-meso- and meso-metanotal sutures deep and well-marked; in profile the thorax slopes slightly backwards, the pronotum is a little raised above the meso- and metanotum, the latter two fairly level, somewhat flat above, the apex of the metanotum obliquely truncate; legs somewhat short and robust. Node of the pedicel as broad as the metanotum, very slightly inclined forward, slightly convex, anteriorly and posteriorly rounded above and laminate; abdomen oval, proportionately longer than in *I. anceps*.

Length, ☿ 2–2·5 mm.

Hab. Western India (*Wroughton*); Burma (*Bingham*); Australia.

The specimens from Burma were procured at Bhamo and at Maymyo, 3000 feet. They are slightly more slender in form, with the head a little broader and the mandibles shorter.

340. **Iridomyrmex lævigatus**, *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 475, ☿; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 468, ☿.

☿. Fuscous brown, the antennæ, thorax beneath and legs slightly paler, the whole head, thorax and abdomen pilose and pubescent, especially the abdomen. Head sub-cordate, the occiput widely emarginate, the posterior lateral angles prominent but

rounded; mandibles triangular, punctured and pubescent, armed along the masticatory margin with 9–10 small black teeth; clypeus broadly triangular, slightly convex, its middle portion anteriorly bent down and flat, the margin entire. Thorax with the pro-meso- and meso-metanotal sutures very deeply impressed, the pro- and mesonotum slightly convex, level; the metanotum moderately gibbous, posteriorly obliquely truncate; legs moderately long and stout, with short, somewhat abundant pale pilosity. Node of the pedicel somewhat thick, its height and thickness subequal; abdomen oval, proportionately longer than in *I. anceps*.

Length, ☿ 3–3·5 mm.

Hab. Burma, the Shan States (*Thompson*); Karennee (*Fea*).

Genus TECHNOMYRMEX.

Formica, pt., *Smith, Jour. Linn. Soc.* vi (1861), p. 38, ☿.
Tapinoma, pt., *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 703, ☿.
Technomyrmex, *Mayr, Ann. Mus. Civ. Gen.* ii (1870). p. 147, ☿ ♀.

Type, *T. strenua*, Mayr, from Borneo.

Range. Ethiopian, Indo-Malayan, and Australian regions.

☿. Head more or less cordate, the occiput emarginate, generally broader than the anterior margin of the head; mandibles broad, triangular, the masticatory margin equal in length to the outer margin, the former armed with numerous small teeth; clypeus broad, convex in the middle, extending angularly up between the antennal carinæ; frontal area indistinct; antennal carinæ short, wide apart, parallel; the scape moderately long, the flagellum thickening slightly towards the apex; eyes comparatively large, placed in front of the transverse middle line of the head. Thorax moderately broad, viewed in profile deeply emarginate at the meso-metanotal suture; the pro-mesonotal suture distinct but not incised; the mesonotum convex, raised slightly above the pronotum, the two together forming a convex gibbosity; metanotum convex, the basal portion slightly sloping forward, the apical portion much longer and sloping backwards; legs comparatively short and stout, the calcaria pectinate, claws simple. Pedicel without a proper elevated node, simply with an oval flat thickening in the middle: abdomen at base very much produced, raised and gibbous, overhanging the pedicel, posteriorly conical, with an apical cloacal aperture.

♀. Closely resembles the ☿, but the head is proportionately broader posteriorly; the ocelli are present and distinct though small; the thorax is more massive; the mesonotum and scutellum nearly flat, very slightly convex; there is a slight constriction behind the wings; the fore wing with a radial and one cubital cell; the metanotum broad, sloping obliquely back to apex, only slightly convex, nearly flat. Pedicel very short, and together with the abdomen as in the ☿.

Key to the Species.

a. Anterior margin of clypeus with a deep crescentic emargination.	
a'. Scape of antennæ scarcely extending beyond top of head.	
a². Black, the tarsi white or brownish white in marked contrast	*T. albipes*, p. 301.
b². Reddish brown, the tarsi slightly paler, not in contrast	*T. brunneus*, p. 302.
b'. Scape of antennæ extending beyond top of head by one-fourth of its length	*T. bicolor*, p. 302.
b. The anterior margin of the clypeus very slightly and widely emarginate	*T. elatior*, p. 302.

341. **Technomyrmex albipes**, *Smith* (Tapinoma), *Jour. Linn. Soc.* vi (1861), p. 38, ☿; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 466.

☿. Black, somewhat shining; the mandibles reddish or yellowish brown, the tarsi white; the head, thorax and abdomen very finely and closely reticulate-punctate, covered with a thin very short silky-white pubescence, and a few scattered erect pale hairs on the front of the head and apex of the abdomen. Head longer

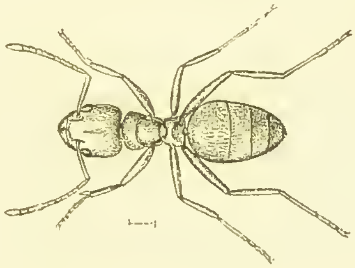

Fig. 91.—*Technomyrmex albipes*, ☿.

than broad, cordate or widely emarginate posteriorly; mandibles characteristic of the genus; clypeus with the anterior margin medially and circularly incised; antennæ with the 2nd and succeeding joints (except the apical joint) as broad as long or broader. Thorax, pedicel and abdomen with the characters as in the genus; the thoracic emargination at the meso-metanotal suture wide but not very deep.

♀. Resembles the ☿, but has the head, thorax and abdomen subopaque, not so shining; the antennæ are dark brown, the legs castaneous red, the tarsi being white as in the ☿. For the rest, see the characters of the genus.

Length, ☿ 2·5–3: ♀ slightly over 3 mm.

Hab. Throughout our limits, and spread over the whole of the tropics of the Old World. The species is frequently imported into Europe with tropical plants; I have seen many specimens from the Kew Gardens. A variety with the tarsi brown instead

of white is common, and has been named var. *brunneipes* by Dr. Forel.

342. **Technomyrmex brunneus.**
Technomyrmex albipes, *race* brunneus, *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 467.

☿. Reddish brown, smooth and shining; the tarsi pale yellowish brown, the posterior margins of the apical three abdominal segments narrowly testaceous; pilosity more abundant than in *T. albipes*. Head broader posteriorly than in front, the occiput widely emarginate; mandibles broadly triangular, convex on the outside, the masticatory margin with numerous minute but acute teeth; clypeus convex, its posterior margin not clearly defined, anteriorly with a medial circular incision in the margin. Thorax in front strongly convex, the meso-metanotal suture not so deep, and the metanotum more rounded than in *T. albipes*; legs more slender. Node of the pedicel and the abdomen as in *T. albipes*.

Length, ☿ slightly over 3 mm.

Hab. Sikhim (*Bingham*); Western India (*Wroughton*). Probably will be found generally distributed in the moister parts of India and Burma.

343. **Technomyrmex bicolor,** *Emery, Ann. Soc. Ent. Fr.* lxii (1893), p. 249, ☿; *Forel, Jour. Bomb. N. H. Soc.* (1895), p. 467, ☿.

☿. Black; the mandibles, antennæ, thorax and legs pale reddish or brownish yellow; pilosity and pubescence as in *T. albipes*. Head subcordate, convex in front; mandibles triangular, broad, the masticatory margin minutely dentate; clypeus as in *T. albipes*: antennæ, especially the scape, proportionately much longer: the joints of the flagellum longer than broad. Thorax more slender than in *T. albipes*; the pro- and mesonotum not so convex; the legs proportionately longer. Pedicel and abdomen as in *T. albipes*.

Length, ☿ 2·5 to nearly 3 mm.

Hab. Ceylon (*Green*).

344. **Technomyrmex elatior.**
Technomyrmex mogdiliani, *Emery,* race elatior, *Forel, Ann. Soc. Ent. Belg.* xlvi (1902), p. 293, ☿.

☿. Black, the antennæ and legs reddish brown, the tarsi paling to yellowish brown; pilosity almost entirely wanting, but the head, thorax and abdomen covered with a thin silky hoary-white pubescence, very short and fine, and only to be seen in certain lights, the pubescence on the tibiæ indistinct but recumbent. Entirely smooth but minutely closely reticulate, dull and subopaque. Head with the cheeks very convex, the occiput emarginate; mandibles proportionately rather large, shining reddish brown; clypeus medially incised, the incision broader than in the other species of the genus and not so deep: antennæ massive, the

scape long, extending slightly beyond the top of the head. Thorax: the pro- and mesonotum convex, obliquely sloping backwards; the pro-mesonotal suture distinct. Viewed in profile, the thorax is emarginate at the meso-metanotal suture, the basal portion of the metanotum short, horizontal, much shorter than the obliquely truncate apical portion; legs stout and long. Pedicel and abdomen much as in *T. albipes*, the latter slightly more massive.

Length, ☿ 2·5–3 mm.

Hab. Assam (*Long*); Upper Burma, Bhamo (*Bingham*); Southern Shan States (*Thompson*).

Genus TAPINOMA.

Formica, pt., *Fabr. Ent. Syst.* ii (1793), p. 353.
Myrmica, pt., *Lepel. Hym.* i (1836), p. 185.
Tapinoma, *Först. Hym. Stud.* i (1850), p. 43, ☿ ♀.

Type, *T. erraticum*, Latr., from Europe.

Range. Both hemispheres.

☿. Head with the mandibles scutiform, the occiput broadly transverse; mandibles triangular, dentate, the masticatory and outer margins subequal; clypeus broad, its anterior margin narrowly incised in the middle (not incised in the Indian species); maxillary 6-, labial palpi 4-jointed; frontal area obsolete; antennæ filiform, 12-jointed; eyes comparatively large, lateral, placed a little to the front. Thorax narrower than the head; the pronotum comparatively convex and a little broader than the rest of the thorax; pro-meso- and meso-metanotal sutures both distinct, the pro- and mesonotum subequal in length; the basal portion of the metanotum very short, the apical portion broad, obliquely truncate, slightly concave; legs comparatively long and slender. Pedicel with the node flat, strongly inclined to the front; abdomen oval, the basal segment gibbous, overhanging the node, and with an almost obsolete fovea on the anterior face for the reception of the node of the pedicel.

♀. Resembles the ☿, but is larger, with a shorter and comparatively broader head, and much larger eyes; ocelli minute but distinct; clypeus not incised anteriorly in the middle. Thorax very massive, broader than the head; the pronotum depressed, vertical, not forming part of the dorsal surface; mesonotum large, convex, gibbous in front; scutellum broad and long; postscutellum transverse; median segment or metanotum as in the ☿, but proportionately much larger; wings ample, fore wing with only one closed cubital cell. Pedicel and abdomen as in the ☿, but much larger.

♂. Resembles the ♀, but the head is almost triangular, the cheeks straighter, not so convex, the mandibles narrow, not dentate, but with the apex acute; the eyes are extraordinarily large and convex, and the ocelli minute and not very distinct. Thorax similar to that of the ♀, but the median segment or metanotum is roundly convex. Pedicel: the node rounded above,

thick; abdomen longer than in the ♀, somewhat narrower, with the base of the 1st segment not gibbous.

Key to the Species.

a. Antennæ long, the scape extending beyond the top of the head . . . . *T. melanocephalum*, [p. 304.
b. Antennæ short, the scape not extending beyond the top of the head . . . . *T. indicum*, p. 304.

345. **Tapinoma melanocephalum**, *Fabr.* (Formica), *Ent. Syst.* ii (1793), p. 353; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 472, ☿.
Formica nana, *Jerd. Madr. Jour. L. S.* xvii (1851), p. 125, ☿.
Myrmica pellucida, *Smith, Cat.* vi (1858), p. 124, ☿.

☿. Head, sometimes the thorax also, fuscous, dark brownish red or black; thorax and abdomen, or abdomen alone, pale brownish or yellowish white. Head, thorax and abdomen somewhat smooth, with a few scattered erect hairs; pubescence in fresh or living specimens very sparse, whitish in colour, but distinctly seen when viewed in certain lights. Head longer than broad, oval, not emarginate, rounded posteriorly; mandibles triangular, broad, with the masticatory margin equal to the outer margin and armed with numerous minute teeth; clypeus evenly but lightly convex, broader than high, its anterior margin transverse or slightly arched; antennæ somewhat thick, the scape long, the joints of the flagellum longer than broad; eyes comparatively large, placed rather forward. Thorax viewed from the side not emarginate, the pro-meso- and meso-metanotal sutures, however, distinct, the thorax slightly constricted at the latter suture; the basal portion of the metanotum very short, passing into the much longer obliquely-sloping portion by an obtuse angle; legs moderately stout. Pedicel short; abdomen elongate, oval.

Length, ☿ 1·5 to barely 2 mm.

Hab. Throughout our limits and spread through the tropics of both hemispheres. I have seen specimens imported into the Kew Gardens with plants.

346. **Tapinoma indicum**, *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 472, ☿.

☿. Resembles *T. melanocephalum*, Fabr.: differs in being sub-opaque, not shining, of a reddish or brownish yellow all over; the mandibles, antennæ and legs pale yellow: pilosity apparently entirely wanting; pubescence thin, silky white, visible only in certain lights. Head broader posteriorly and shorter than in *T. melanocephalum*. Mandibles and clypeus similar, the posterior margin of the latter, however, clearly defined; antennæ shorter, joints 3–8 of the flagellum not longer than broad. Thorax proportionately much broader in front, and posteriorly laterally compressed; seen in profile not emarginate, but the sutures as

distinct as in *T. melanocephalum.* Pedicel and abdomen as in that species; the latter, however, proportionately slightly shorter.

Length, ☿ 1·5 mm.

Hab. Recorded so far from Western India only (*Wroughton*).

Genus BOTHRIOMYRMEX.

Tapinoma, pt., *Roger, Berl. ent. Zeit.* vii (1863), p. 165, ♀.

Hypoclinea, pt., *Mayr, Beitr. Naturk. Preussen,* i (1868), p. 56, pl. i, figs. 3–7, & pl. iii, figs. 42–46, ☿ ♀ ♂.

Bothriomyrmex, *Emery, Ann. Mus. Zool. Univ. Nap.* v (1865), p. 117.

Type, *B. meridionalis*, Roger, from Italy and Spain.

Range. Palæarctic, Ethiopian, Indo-Malayan, and Australian regions.

☿. Has somewhat of the same characters as the genus *Tapinoma*, Först., but the whole insect is broader in proportion to its length, the head being nearly square, almost as broad in front as posteriorly, the cheeks straight and not convex; mandibles narrower, when closed hidden under the anterior margin of the clypeus, which is not incised as in *Tapinoma*; antennæ 12-jointed, the apical joint as long as the preceding three joints; eyes proportionately much smaller. Thorax broad in front, compressed posteriorly; the pronotum proportionately broader in front than in *Tapinoma*, and longer than the mesonotum; the pro-meso- and meso-metanotal sutures distinct; the metanotum with a still shorter basal portion than in *Tapinoma*, and an obliquely truncate apical portion; legs shorter and stouter than in *Tapinoma*. Pedicel and abdomen very like those in *Tapinoma*, but shorter and broader, and the node of the pedicel distinctly raised and not flattened on the pedicel.

♀. Mandibles triangular, with 6 teeth; clypeus wide, bisinuate along the anterior margin; frontal area triangular, depressed, longer than broad, antennal and clypeal hollows confluent; antennal carinæ short, wide apart; antennæ 12-jointed, somewhat massive. Thorax and abdomen much as in *Tapinoma*, but proportionately more massive; the pedicel with an erect node; wings with one cubital and one discoidal cell.

♂. Mandibles narrower than in the ♀, acute; clypeus trapezoidal, convex; eyes very large, ocelli prominent; antennæ as usual in ♂, with 13 joints, the joints much longer proportionately than in the ♀. Thorax and abdomen as in the ♀, but narrower. Pedicel with the node thick, rounded above.

Key to the Species.

a. Head, thorax and abdomen brownish black; mandibles armed with 7 teeth . . . . *B. walshi*, p. 306.

b. Head, thorax and abdomen some shade of yellow or brownish yellow; mandibles armed with 4–6 teeth.

a'. Head without mandibles longer than broad.
*a*². Occiput transverse; length under 2 mm. *B. myops*, p. 306.
*b*². Occiput distinctly though widely emarginate; length over 2 mm. .... *B. dalyi*, p. 307.
b'. Head without mandibles square, as long as broad .... *B. wroughtoni*, p. 307.

347. **Bothriomyrmex walshi**, *Forel, Jour. Bomb. N. H. Soc.* ix (1895), pp. 469, 471, ☿ ♀.

☿. Dark castaneous brown or black, smooth and shining, except the abdomen, which is conspicuously pubescent; the mandibles, antennæ, tibiæ and tarsi of the legs yellowish. Head oval, longer than broad; mandibles stout, convex, exteriorly with 7 small but acute teeth; clypeus subtriangular, its anterior margin transverse, posterior margin not clearly defined; antennæ comparatively short and stout, densely pubescent, the scape not quite reaching the top of the head; eyes placed laterally and a little forward, closer to the base of the mandibles than to the top of the head. Thorax short and comparatively broad, the pro-meso- and meso-metanotal sutures very distinct and well-marked, the pronotum, mesonotum and basal portion of the metanotum convex, the last obliquely truncate at apex, the truncate apical portion much longer than the basal portion; legs short, somewhat stout and densely pubescent. Node of the pedicel low, flat posteriorly, inclined to the front; abdomen broadly oval.

Length, ☿ 1·5–2 mm.

Hab. Sikhim (*Bingham*); Bengal (*Rothney*).

348. **Bothriomyrmex myops**, *Forel, Jour. Bomb. N. H. Soc.* ix (1895), pp. 469 & 471, ☿ ♀.

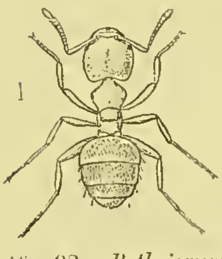

Fig. 92.—*Bothriomyrmex myops*, ☿.

☿. Head, thorax and abdomen pale yellow, very slightly tinted with brown, especially on the abdomen, antennæ and legs a shade paler; the whole insect densely pubescent, especially on the abdomen, pubescence mixed with a few scattered erect pale hairs on the front of the head and apex of the abdomen. Head proportionately very large, convex anteriorly; mandibles broad, punctured, pubescent; clypeus widely subtriangular, anterior margin transverse, posterior margin distinct, well defined; antennæ proportionately very thick, rather short, the scape barely reaching the top of the head, the 2nd joint of the flagellum as broad as long, longer than the 3rd joint; eyes very small, smaller than in any other known Indian species, placed, as in *B. walshi*, below the transverse middle line of the head. Thorax short and broad, the thoracic sutures distinct, the

pro-, meso- and basal portion of metanotum viewed from above convex and subequal. Node of the pedicel very low, strongly inclined forward; abdomen comparatively large and massive, very convex in front.

♀. Resembles the ☿, but is larger and more massive; the head is smaller proportionately, the eyes larger; the thorax not very gibbous or convex above, the node of the pedicel higher; the abdomen more elongate and subcylindrical. Colour a pale reddish brown.

Length, ☿ 1·5–2; ♀ 3·5 mm.

Hab. North-West Provinces (*Smythies*): Sikhim (*Bingham*); Western India (*Wroughton*).

349. **Bothriomyrmex dalyi**, *Forel*.

Bothriomyrmex wroughtoni, *Forel, race* dalyi, *Forel, Jour. Bomb. N. H. Soc.* ix (1895), pp. 469 & 471, ☿.

☿. Head, thorax and abdomen yellowish brown, the abdomen sometimes dark brown. The whole insect covered with a whitish pubescence, most dense and somewhat long on the head and abdomen; pilosity very sparse, confined to a few scattered pale hairs on the front of the head and on the abdomen posteriorly. Head with the mandibles broadly oval, the top of the head slightly convex, the occiput widely emarginate; mandibles broad, with 4 teeth placed rather wide apart; clypeus much broader than high, slightly convex, its anterior margin slightly but distinctly arched; antennæ more slender and longer than in *B. myops*, the scape extending slightly above the top of the head, the 2nd joint of the flagellum distinctly longer than broad; eyes larger, placed more to the front than in *B. myops*. Thorax short, somewhat laterally compressed. Node of the pedicel higher and more erect than in *B. myops*; abdomen broadly oval.

Length, ☿ 2–2·5 mm.

Hab. Apparently generally spread through India; recorded from Coonoor (*Wroughton*), Bengal (*Rothney*), and Western India.

Dr. Forel considers this species merely a race of *B. wroughtoni*, Forel, but it differs constantly in the shape and proportions of the head, and in being more pubescent.

350. **Bothriomyrmex wroughtoni**, *Forel, Jour. Bomb. N. H. Soc.* ix (1895), pp. 469 & 470, ☿ ♂ ♀.

☿. Head and thorax brownish yellow; abdomen brown, sometimes with a yellowish tint, the whole insect covered with a fairly abundant pale pubescence, especially dense on the abdomen. Head without the mandibles square, as broad posteriorly as in front, very convex; mandibles comparatively broad, the masticatory margin oblique, armed with 4 blunt teeth; clypeus convex, broad,

subtriangular, anteriorly lightly arched; antennæ thick and rather long, the scape extending beyond the top of the head; the 2nd joint of the flagellum longer than broad. Thorax short and broad, thoracic sutures well-marked; the pro-, meso- and metanotum convex, the latter apically truncate and sloping; legs robust. Node of the pedicel comparatively erect and high; abdomen broadly oval.

♀. Resembles the ☿, but is dark brown; the mandibles, articulation of the joints of the legs, and the tarsi yellow; the antennæ very pale whitish yellow. Head square, posteriorly slightly emarginate; the mandibles and clypeus as in the ☿, the antennæ proportionately more slender and filiform, the basal two joints of the flagellum of the antennæ elongate. Thorax somewhat flat above; the wings hyaline, nervures pale yellow; the node of the pedicel and the abdomen as in *B. myops*.

♂. Resembles the ♀ in colour. Head orbicular; eyes and ocelli very large; mandibles narrow and pointed; clypeus very convex, transverse; antennæ filiform, the 2nd joint of the flagellum elongate, longer than the 1st or 3rd. Thorax very massive; the mesonotum somewhat flat; the scutellum slightly convex, elevated above the basal portion of the metanotum, which is horizontal and shorter than the apical truncate portion.

Length, ☿ 2·3–2·8; ♀ 3·5; ♂ 2–2·5 mm.

Hab. Recorded from the North-West Provinces (*Smythies*), Western India (*Wroughton*), and Ceylon (*Yerbury*). Probably spread throughout our limits.

Subfamily CAMPONOTINÆ.

The species belonging to this subfamily are probably mentally and socially the most highly developed of all the ants. Structurally they are distinguished by having a one-jointed pedicel with no constriction between the two basal abdominal segments; the poison-glands and sting are considerably modified, the former being converted into a cushion of convolutions, the latter forming merely an orifice for the ejaculation of the poison, which in certain genera (*Œcophylla*, for instance) can be done with considerable force; *the orifice of the cloaca is in this subfamily always circular, and ciliated round the margin.*

Certain genera—*Formica* and *Myrmecocystus*—are well known as slave-makers, but the habit seems confined to the species in Europe, and does not, so far as has been observed, obtain in the representative or even in the same species in India. Species of the *Camponotinæ*, and especially of the representative genus *Camponotus*, are pre-eminently known as farmers of Aphides, Homoptera, Lycænid-larvæ, and such-like ant-cattle. A most

interesting account of ants tending larvæ is given at p. 164, vol. iii (1888), of the Bombay Natural History Society's Journal.

Key to the Genera.

A. Mandibles long, linear, cylindrical, bent at right angles and dentate at apex, denticulate on inner margins . . . . MYRMOTERAS, [p. 313.

B. Mandibles not so formed.

a Antennæ 12-jointed.

a^1. Maxillary palpi 6-jointed.

a^2. Antennæ inserted at a perceptible distance from posterior margin of clypeus.

a^3. Thorax and node of pedicel not dentate nor spinous, nor with the angles markedly produced; basal two abdominal segments equal or subequal in length.

a^4. Head not truncate anteriorly . . . . CAMPONOTUS, p. 347.

b^4. Head truncate anteriorly; very markedly so in the ☿ maj. . . . . . . COLOBOPSIS, p. 342.

b^3. Thorax and node of pedicel spinous or dentate, or with the angles markedly produced; basal segment of abdomen much longer than 2nd segment.

a^4. Eyes entire, round or oval . . . . . . POLYRHACHIS, [p. 382.

b^4. Eyes truncate posteriorly. . . . . HEMIOPTICA, p. 380.

b^2. Antennæ inserted immediately above posterior margin of clypeus, almost touching it.

a^3. Antennal and clypeal hollows not confluent, distinct . . . . PRENOLEPIS, p. 325.

b^3. Antennal and clypeal hollows confluent.

a^4. Ocelli absent.

a^5. ☿ maj. very much larger than ☿ min.; eyes very small . . . . PSEUDOLASIUS, [p. 337.

b^5. ☿ maj. and ☿ min. almost equal in size; eyes moderately large. LASIUS, p. 338.

b^4. Ocelli present.

a^5. Node of pedicel rounded; 4th joint of maxillary palpi nearly twice as long as 5th . . . . MYRMECOCYSTUS, [p. 312.

b^5. Node of pedicel flat; 4th joint of maxillary palpi only a little longer than 5th . . . . FORMICA, p. 333.

b^1. Maxillary palpi 5-jointed . . . . ŒCOPHYLLA, p. 310.

b. Antennæ 11-jointed.

a^1. Maxillary palpi 6-jointed.

a^2. Metanotum and node of pedicel more or less bispinous or bidentate. . . . . ACANTHOLEPIS, [p. 314.

b^2. Metanotum and node of pedicel without spines or teeth . . . . PLAGIOLEPIS, p. 319.

b^1. Maxillary palpi 2-jointed . . . . ACROPYGA, p. 332.

Genus ŒCOPHYLLA.

Formica, pt., *Fabr. Syst. Ent.* 1775, p. 392, ☿.
Œcophylla, *Smith, Jour. Linn. Soc.* v (1861), p. 101, ☿ ♀.

Type, *Œ. virescens*, Fabr., from Australia.

Range. Palæarctic, Ethiopian, Indo-Malayan, and Australian regions.

☿. Head of ☿ *maj.* and of ☿ *min.* relatively of the same size, roundly quadrangular without the mandibles, posteriorly transverse, not emarginate, and slightly broader than in front; mandibles long, with the masticatory margin very broad in proportion to length, dentate, the apical tooth acute and curved; palpi very short, maxillary with 5, labial with 4 joints; clypeus strongly convex, about two-thirds as high as broad below, its anterior margin strongly arched; frontal area small, triangular; antennal carinæ short, comparatively wide apart, parallel; antennæ 12-jointed, filiform, their origin remote from the posterior margin of the clypeus; eyes large, prominent; ocelli absent. Thorax elongate; pronotum convex, anteriorly narrowed into a collar;

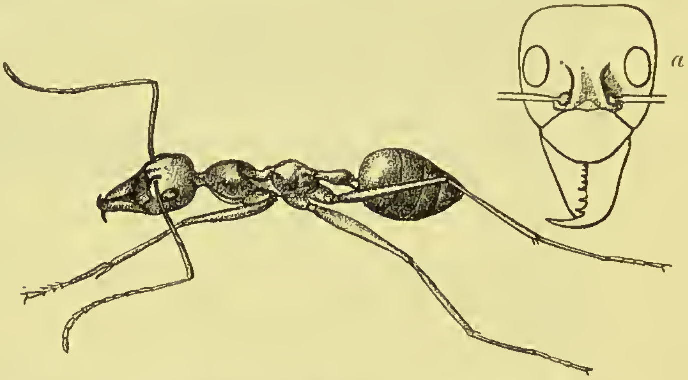

Fig. 93.—*Œcophylla smaragdina*, ☿. *a*. Head from front.

mesonotum constricted, narrow, viewed sideways saddle-shaped as in *Myrmecocystus*; metanotum rounded above, gibbous; thoracic sutures distinct; legs long and slender. Pedicel elongate, incrassate in the middle, scarcely nodiform; abdomen short, oval.

♀. Resembles the ☿, but the head is very broad and transverse posteriorly; the thorax proportionately shorter and more massive, the pronotum vertical and overhung by the remarkably broad and gibbous mesonotum; scutellum also broad and gibbous, compressed; postscutellum and median segment roundly sloped posteriorly; legs shorter and relatively stouter; wings broad and ample, with a marginal and one cubital cell. Pedicel relatively shorter, with a broad subquadrate node very thick at base and thin along the upper margin, which is broadly emarginate abdomen oval, very broad and massive.

♂. Head relatively very small; the mandibles narrow, porrect, very hairy, and with an indistinct dentate masticatory margin;

ocelli prominent; eyes very large and prominent, giving great width to the head; antennæ 13-jointed, filiform; the scape long, thickening slightly towards the apex, the basal joint of the flagellum remarkably clavate. Thorax very massive, the mesonotum broad and gibbous anteriorly, the pronotum sunk well below its level in front; scutellum large, laterally compressed, the rest of the thorax and median segment sloping gradually to the apex of the latter. Pedicel long, linear, scarcely thickened at all; abdomen depressed, oval; external genitalia large.

351. **Œcophylla smaragdina**, *Fabr.* (Formica) *Syst. Ent.* 1775, p. 828, ♀; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 400.

☿ *maj.* Rusty red, sometimes yellowish red, varying in depth of tint according to locality: specimens from Travancore, Cochin, Ceylon, and Tenasserim are of a brighter richer red than the yellowish form found in the drier parts of India. Head and thorax not pilose, abdomen with a few short erect hairs, chiefly beneath and along the margins of the segments; pubescence very thin, fine and minute, rather whitish in colour; the head, thorax, legs, node of pedicel and abdomen dull, subopaque. For the rest the characters of the genus.

☿ *min.* Exactly similar, slightly smaller.

♀. Characters of the genus. Normally of a beautiful emerald-green, with a peculiar pellucid translucent appearance when alive. Varieties are found of a pale yellow, with more or less of brownish markings on the head and thorax, and nine out of every ten specimens preserved in spirit, or dry, change their beautiful emerald-green for a dingy yellow.

♂. More or less similar in colour to the ☿, sometimes dark brown, very pilose, the hairs reddish brown and semierect; wings lacteous, hyaline, nervures yellowish brown. For the rest the characters of the genus.

Length, ☿ *maj.* 9·5–11; ☿ *min.* 7–8; ♀ 15–18; ♂ 6–7 mm.

Hab. The whole of India, Burma and Ceylon within our limits, except the desert and treeless tracts. The range of this species extends through the Malayan subregion to Australia and New Guinea.

This is the notorious and vicious "Red Ant" of India; it inhabits trees and makes a nest of leaves. Its habits have been very fully described by Messrs. Aitken *, Wroughton †, Rothney ‡, and Green §. Mr. E. E. Green records the remarkable habit *Œ. smaragdina* has of using its larvæ to spin the silk with which its nest of leaves is constructed. In Kanara and some other parts of India, and throughout Burma and Siam, a paste made of this species of ant pounded is eaten as a condiment with curry.

* Jour. Bomb. N. H. Soc. vol. iv (1889), p. 151; & vol. v (1890), p. 422.

† *Op. cit.* vol. vii (1893–94), p. 39.

‡ Trans. Ent. Soc. 1889, pp. 355 & 358–361.

§ Proc. Ent. Soc. 1896, p. ix, and Jour. Bomb. N. H. Soc. xiii (1900), p. 181.

Genus MYRMECOCYSTUS.

Formica, pt., *Fabr. Mant. Ins.* i (1787), p. 308, ☿.
Myrmecocystus, *Wesm. Bull. Acad. Sc. Brux.* v (1838), p. 770.
Cataglyphis, *Först. Verh. Nat. Ver. Preuss. Rheinl.* vii (1850), p. 493.

Type, *M. melligera*, Llave, from America.

Range. Both hemispheres.

☿. Head without the mandibles quadrangular, not emarginate posteriorly, the sides straight or very slightly convex; mandibles comparatively large, strongly dentate, the apical tooth remarkably long, curved and acute; maxillary palpi 6-jointed, very long, the 3rd and 4th joints the longest, the latter twice as long as the 5th and arched; labial palpi 4-jointed as in *Formica*; clypeus convex, its anterior margin slightly arched; frontal area triangular, with the clypeal-frontal suture distinct; antennal carinæ very short, parallel; antennæ springing from immediately behind the posterior border of the clypeus, 12-jointed, filiform; eyes of moderate size, oval, placed well above the middle line of the head; ocelli present. Thorax viewed from the side constricted in the middle, saddle-shaped, the sutures well-marked; pronotum convex; mesonotum long, narrow, rounded above; metanotum short, gibbous; legs long and slender. Pedicel one-jointed, node rounded, not much raised; abdomen somewhat short, oval, capable in the typical species, which is American, of immense dilatation.

♀. Similar to the ☿. Wings short, hyaline, the nervures thick, with one cubital and one small, frequently incomplete, discoidal cell.

♂. Head smaller than in the ☿; mandibles narrow, indistinctly bidentate; antennæ 13-jointed, the scape long. Thorax compressed; pronotum slightly concave in the middle. Node of the pedicel quadrangular; abdomen cylindrical. Genitalia very large, the pencili wanting, but the laminæ present; the external genital plate bearing an appendix on the inner side.

Only a single species (☿ only known), that differs slightly but constantly from the European and North African form, is found within our limits.

352. **Myrmecocystus setipes**, *Forel.*
Myrmecocystus viaticus, *race* setipes, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 401, ☿.

☿. Head, thorax, legs and node of pedicel dark red, abdomen black; the legs of a darker shade than the thorax, almost black. Pilosity on the head, thorax and abdomen sparse, confined to a few scattered erect hairs, most numerous on the underside of the abdomen; legs densely setose and spinous: pubescence extremely minute and fine, with a silvery glint, but giving the head, thorax and abdomen a dull subopaque appearance. For the rest the characters of the genus.

Length. ☿ 10–12 mm.

Hab. Confined within our limits to the United Provinces, the Punjab, and Central India, but extending westwards into Persia.

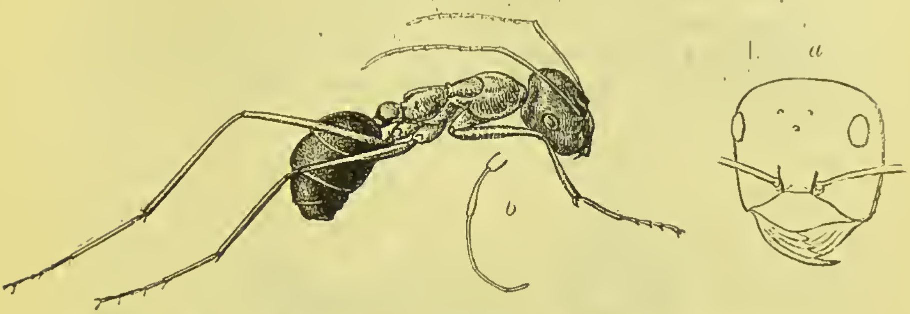

Fig. 94.—*Myrmecocystus setipes*, ☿. *a*. Head from front; *b*. Maxillary palpus.

The closely allied *M. viaticus*, Fabr., of which Dr. Forel considers *M. setipes* a race, is found in North-eastern and Northern Africa and Southern Europe.

Specimens of an extremely pale-coloured variety of *M. setipes* are in the British Museum Collection, from the N.W.P. of India. This variety is of a pale testaceous yellow all over, with the abdomen shaded with fuscous. In structure and pilosity it agrees with *M. setipes*.

Genus MYRMOTERAS.

Myrmoteras, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 418, ☿.

Type, *M. binghami*, Forel, from Tenasserim.

Range. Procured so far only on the western borders of Tenasserim.

☿. Head remarkably large, very much broader than either the thorax or the abdomen; mandibles very long, about twice the length of the head, linear and slender, resembling somewhat the mandibles of *Odontomachus*, and armed similarly with teeth on the inner margin, but unlike the mandibles of *Odontomachus* those of *Myrmoteras* are articulated at the anterior lateral angles of the head, and not close together in the middle of the anterior margin; clypeus subquadrate, lightly convex, its anterior margin waved; antennal carinæ entirely wanting; antennæ 12-jointed, filiform, the scape remarkably long, about one-eighth only shorter than the flagellum; forehead very broad, ocelli present; eyes remarkably large, occupying the whole side of the head; above the ocelli the top of the head is transverse, the posterior portion divided off by a curious deep wrinkle or transverse furrow. Thorax resembles that of *Œcophylla*, constricted and hollow at the mesonotum, saddle-shaped; legs long, moderately stout. Pedicel one-jointed, elongate; node conical, rather flat at the top; abdomen oval, convex above, about as broad as the pronotum.

♂ and ♀ unknown.

353. **Myrmoteras binghami**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 419, ☿.

☿. Bright reddish brown, highly polished and shining; antennæ and legs yellowish brown, mandibles yellow. Pilosity very sparse, confined to a few scattered erect soft pale hairs, pubescence nil. Mandibles curved inwards at apex into an acute long tooth, armed

Fig. 95.—*Myrmoteras binghami*, ☿. *a*, Head; *b*, Mandible.

on the inner margin with altogether 11 teeth, of which the apical and three or four subapical are long and acute; of the minute teeth two are preapical, lying between the 1st and 2nd long tooth, and the rest towards the base. For the rest the characters of the genus.

Length, ☿ 7 mm., including the mandibles; mandibles 2 mm.

Hab. Thaungyin Valley, Tenasserim.

Dr. Forel considers that the enormous size of the eyes marks this species as probably a tree-ant.

Genus ACANTHOLEPIS.

Hypoclinea, pt., *Mayr, Verh. zool.-bot. Ver. Wien*, v (1855), p. 377, ☿.
Acantholepis, *Mayr, Eur. Form.* 1861, p. 42, ☿ ♀.

Type, *A. frauenfeldi*, Mayr, from Europe.

Range. Palæarctic, Ethiopian, and Indo-Malayan regions.

☿. Head without the mandibles quadrangular, somewhat rounded above, the occiput not emarginate; mandibles with the masticatory margin oblique, dentate; clypeus broad and high, sharply carinate down the middle, clypeal and antennal hollows confluent, large, frontal area small but distinct; antennal carinæ short, wide apart, parallel; antennæ 11-jointed, filiform, the scape elongate, reaching well beyond the top of the head; eyes of moderate size; ocelli distinct, rather widely separated one from the other. Thorax constricted at the mesonotum; the pronotum broad and convex anteriorly, somewhat compressed and seemingly pinched up posteriorly; pro-meso- and meso-metanotal sutures distinct; metanotum obtusely dentate on each side in the middle; legs somewhat long and slender. Pedicel one-jointed, with a

laminate node having a tooth or spine on each side above; abdomen broadly oval, rather acutely pointed at apex.

♀. Large proportionately to the ☿; head triangular, very broad posteriorly; clypeus broad and high, convex and strongly vertically carinate. Thorax massive, the mesonotum very large, gibbous in front, overhanging the pronotum, which forms no portion of the dorsum; scutellum subtriangular, wide at base; mesonotum and scutellum obscurely longitudinally carinate in the middle. Node of the pedicel pentagonal, the upper border deeply emarginate: abdomen massive.

♂. Head small in proportion to the thorax, the latter very massive and broad; mandibles narrow, porrect; eyes very large, reaching down to the base of the mandibles; mesonotum large, slightly convex, not carinate as in the ♀; wings lacteous, hyaline, broad and long, the apex reaching considerably beyond the apex of the abdomen.

Key to the Species.

- *a*. Scape of antennæ remarkably long, extending for more than half its length beyond the top of the head .... *A. frauenfeldi*, p. 316.
- *b*. Scape of antennæ shorter, extending beyond the top of the head by not more than one-third of its length.
  - *a*. The upper lateral angles of the node of the pedicel surmounted by long, fine, acute vertical spines.
    - a^2. Abdomen purplish brown or black, without yellow markings .... *A. opaca*, p. 318.
    - b^2. Abdomen dull black, the basal segment above and in front brownish yellow.. *A. pulchella*, p. 318.
  - *b'*. The upper lateral angles of the node of the pedicel furnished with short thick spines or teeth pointing more or less outwards, or with the upper border of the node simply emarginate.
    - a^2. Head, thorax and abdomen abundantly pilose.
      - a^3. Head punctured, opaque; head and abdomen reddish brown, thorax and a spot at the base of the abdomen yellow .... *A. fergusoni*, p. 319.
      - b^3. Head highly polished and shining, head and abdomen black.
        - a^4. Head without the mandibles about as broad as long, thorax black .. *A. capensis*, p. 316.
        - b^4. Head without the mandibles distinctly longer than broad, thorax reddish yellow .... *A. modesta*, p. 317.
    - b^2. Head, thorax and abdomen smooth, without hairs except at the apex of the abdomen...................... *A. simplex*, p. 317.

354. **Acantholepis frauenfeldi**, *Mayr* (Hypoclinea), *Verh. zool.-bot. Ver. Wien*, v (1855), p. 378, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 411, 413, ☿.

☿. Head, thorax, legs and node of the pedicel brownish yellow; abdomen very dark brown; the head, except the mandibles and antennæ, of a darker shade than the thorax. Pilosity and pubescence almost entirely absent; head, thorax and abdomen smooth and shining, the last highly polished. Head viewed from the front distinctly longer than broad, rounded above; mandibles somewhat narrow, curved, with the apical tooth long and acute; clypeus strongly convex, proportionately rather large, with a faint transverse subapical furrow parallel to its anterior margin, the suture between its posterior margin and the frontal area distinct; eyes lateral, situated about the middle of the head. Thorax: the pronotum from above appears almost circular, the mesonotum strongly constricted in front forming a cylindrical neck, widening posteriorly; the metanotal teeth thick and broad at base, obtuse; the meso-metanotal suture above deep and distinct. Node of the pedicel seen from the back pentagonal, the upper border slightly emarginate, with a not very distinct obtuse tooth at its lateral angles; abdomen oval, somewhat massive.

♀. Head very small in proportion to the very massive thorax and abdomen; head, thorax and abdomen of a rich brown colour, covered with a dense silky golden pubescence, with a few obliquely erect scattered hairs on the abdomen. For the rest the characters of the genus.

Length, ☿ 2·5–3; ♀ 5 mm.

Hab. Within our limits spread irregularly in one form or another through Continental India, confined chiefly to the hills but procured by Mr. Rothney at Barrackpore. Not recorded from Burma or Ceylon. It extends to Southern Europe and Northern Africa.

This is a variable species. Var. *A. bipartita*, Smith, is the common Indian form. It differs from the type in averaging slightly larger (2·8–3·3 mm.), in being more robust and somewhat darker in colour; the upper border of the node of the pedicel is more deeply emarginate.

Var. *integra*, Forel, has the node of the pedicel unarmed, and is nearly black with a few brownish marks on the mandibles, antennæ, thorax and legs.

Var. *sericea*, Forel, is much larger (3–3·6 mm.); it is finely and evenly sculptured and has a fairly dense silky pubescence.

355. **Acantholepis capensis**, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 699, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 412, 414, ☿; ix (1895), p. 458.

☿. Black and shining, the mandibles, antennæ and legs brownish yellow. Head, thorax and abdomen, particularly the last, with abundant yellowish erect hairs. Head in front strongly convex; mandibles rather small, when closed nearly hidden under

the large convex clypeus. Thorax as in *A. frauenfeldi*, but not so strongly constricted at the mesonotum, with the large lateral obtuse tubercles or teeth on the metanotum proportionately larger, the metanotum itself finely sculptured. Node of the pedicel with the upper border strongly emarginate and bidentate; abdomen oval, broad, anteriorly rapidly narrowing towards the apex.

♀. Brown, with a more or less dense golden-yellow pubescence. Except that it is slightly larger and the node of the pedicel above is more deeply emarginate, it is scarcely distinguishable from *A. frauenfeldi* ♀.

♂. Brown, smooth and shining, apparently without pilosity or pubescence; mouth-parts, antennæ and legs pale whity-brown. For the rest the characters of the genus.

Length, ☿ 2·3–3·3; ♀ 5·3; ♂ 2 mm.

Hab. The Himalayas to 5000 ft. (*Smythies & Möller*); Central India (*Schurr*); Poona (*Wroughton*); Ceylon (*Simon*). Extending to Aden and North-eastern Africa.

356. **Acantholepis modesta**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 412, ☿.

" ☿. Resembles *A. capensis*, but is more slenderly built; mesonotum more constricted. Head narrow, oval, much longer than broad. Eyes placed laterally in the middle. Metanotum with two strong obtuse teeth. Node of the pedicel thick, bispinous, with angles laterally below the spines. Pilosity of the body longer, more abundant, very fine and very acute. Thorax and node of the pedicel of a reddish yellow, with brown markings on the back. It is perhaps a race of *A. capensis*.

" *Length*, ☿ 2·3 mm.

" *Hab.* Mussoorie." (*Forel.*)

Unknown to me, but apparently very well distinguished by the elongate head. In all the other Indian species the head without the mandibles is nearly as broad as long.

357. **Acantholepis simplex**, *Forel, Ann. Soc. Ent. Belge*, xxxvi (1892), p. 43, ☿; *Jour. Bomb. N. H. Soc.* viii (1892), p. 412, ☿.

☿. Closely allied to and resembling *A. capensis*, Mayr, but smaller and entirely without pilosity or pubescence. Black, the mandibles, antennæ, and the tibiæ and tarsi of the legs brownish white. Head short, shorter proportionately than in *A. capensis* and not so rounded above, transverse; mandibles proportionately large, acutely dentate; clypeus very convex; antennæ short, the scape extending only a little beyond the top of the head. Thorax narrower and more constricted than in *A. capensis*, the metanotum enlarged posteriorly, with proportionately much smaller lateral obtuse teeth or tubercles. Node of the pedicel only slightly emarginate above, the lateral angles of the margin above not spinous or dentate; abdomen as in *A. capensis*.

Length, ☿ 2 mm.

Hab. Recorded so far within Indian limits only from Orissa in Bengal (*Taylor*), but probably extends through Northern India to Arabia and North-eastern Africa. Originally described from Somaliland.

358. **Acantholepis opaca**, *Forel, Ann. Soc. Ent. Belge*, xxxvi (1892), p. 42; *Jour. Bomb. N. H. Soc.* viii (1894), p. 413, ☿; ix (1895), p. 458.

☿. Head reddish brown, mandibles and antennæ pale testaceous, thorax and node of pedicel reddish yellow, legs testaceous shaded with fuscous, abdomen a beautiful purplish black. Head and thorax finely and very closely punctured, opaque; abdomen shining, with in certain lights a metallic tint. Head, thorax and abdomen covered with fairly abundant short semi-erect white hairs, and an extremely minute sericeous pubescence only seen in certain lights. Head without the mandibles nearly square, the occiput slightly flattened and transverse; mandibles rather large, acutely dentate; clypeus large and very convex, medially vertically carinate; antennæ with the scape rather short, extending very little beyond the top of the head. Thorax: the pronotum broad, nearly as broad as the head, flat above, the mesonotum moderately constricted, the meso-metanotal suture deep and wide; the metanotum short, its sides forming lateral acute tubercles. Node of the pedicel proportionately somewhat thick and high, surmounted by two parallel acute spines on the lateral angles above; abdomen large and massive, slightly depressed and acutely pointed at apex.

Length, ☿ 2·2–2·5 mm.

Hab. Western India: recorded from Kanara and Goa (*Aitken*).

359. **Acantholepis pulchella**, *Forel, Ann. Soc. Ent. Belge*, xxxvi (1892), p. 43, ☿.

☿. Resembles *A. opaca*, Forel, but the thorax, especially the pronotum, is narrower, and the region of the mesonotum is not so

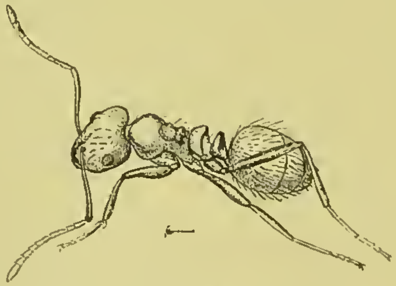

Fig. 96.—*Acantholepis pulchella*, ☿.

strongly constricted. Head, thorax and abdomen dark purplish brown, lighter on the anterior portion of the thorax, while the abdomen is dull black, with a light reddish-yellow spot above at

base covering the 1st and anterior portion of the 2nd segment; sculpture as in *A. opaca*; pilosity and pubescence entirely wanting. Head rounder, more convex in front, the occiput arched, not transverse. Thorax and abdomen as in *A. opaca*.

Length, ☿ 2·5–3 mm.

Hab. Western India, Poona (*Wroughton*).

360. **Acantholepis fergusoni**, *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 459, ☿.

☿. Head and abdomen reddish brown; the mandibles, clypeus, thorax, node of the pedicel, the base of the 1st abdominal segment broadly and a narrow transverse line at the base of the 3rd segment, yellow; antennæ and legs pale brown. Head without the mandibles about as broad as long, lightly convex in front; the occiput transverse, densely and very finely punctured, opaque; mandibles narrow, curved, armed with 4 teeth; clypeus convex; antennal carinæ short, widely separated, slightly divergent posteriorly. Thorax: the pronotum from above circular, rather flat, the mesonotum depressed, the thorax deeply emarginate behind the mesonotum; metanotum short, the basal portion from above crescentic, the two horns of the crescent formed by thick curved teeth or tubercles. Node of the pedicel emarginate above; abdomen comparatively massive and broad.

Length, ☿ 3–3·5 mm.

Hab. Travancore, Southern India (*Ferguson*).

Genus **PLAGIOLEPIS.**

Formica, pt., *Latr. Ess. Hist. Fourm. Fr.* 1798, p. 45.
Plagiolepis, *Mayr, Eur. Form.* 1861, p. 42, ☿ ♀ ♂.

Type, *P. pygmæa*, Latr., from Europe.

Range. Both hemispheres.

☿. Mandibles somewhat narrow, masticatory margin oblique with 5 teeth, the apical tooth long and acute; clypeus comparatively large, convex, carinate, lozenge-shaped, its anterior margin arched and partially covering the mandibles; antennal carinæ short, rather wide apart, parallel; antennæ 11-jointed; frontal area ill-defined. Thorax very slightly constricted between the meso- and metanotum, in some species a little saddle-shaped; legs long and slender. Node of pedicel variable, in some species acute, above flat, in others thick and rounded above; in all inclined to the front. Abdomen massive.

♀. Head and node of pedicel as in the ☿; clypeus not carinate. Thorax depressed, rather broader proportionately than in the ☿. Wings with one cubital and no discoidal cell.

♂. Mandibles triangular; clypeus, antennæ and node of the pedicel as in the ☿. Head very small; frontal area sharply defined, broad transversely, filling the space between the antennal carinæ; antennæ 12-jointed. Thorax somewhat depressed and flat above; the pronotum vertical, forming no part of the dorsum;

abdomen more or less cylindrical; external genitalia large, the valves produced at apex into an obtuse point.

Key to the Species.

A. Length over 2 mm.
  a. Scape of the antennæ very long, extending beyond the top of the head by more than half its length . . . . *P. longipes*, p. 320.
  b. Scape of the antennæ short, extending very little beyond the top of the head.
    a'. Ocelli present.
      *a*². Clypeus with a median vertical carina.
        *a*³. Basal two abdominal segments densely pubescent, opaque . . . . . . *P. moelleri*, p. 321.
        *b*³. Basal two abdominal segments sparsely pubescent, shining . . . . *P. wroughtoni*, p. 321.
      *b*². Clypeus not carinate, convex . . . . . . *P. rothneyi*, p. 322.
    b'. Ocelli absent . . . . *P. watsoni*, p. 322.
B. Length under 2 mm.
  a. Colour pale dull brownish yellow.
    a'. Head, thorax and abdomen punctured . *P. exigua*, p. 323.
    b'. Head, thorax and abdomen smooth, not punctured . . . . *P. dichroa*, p. 323.
  b. Colour black or dark chestnut-brown.
    a'. Frontal area distinct, well-defined.
      *a*². Head striate, opaque . . . . *P. rogeri*, p. 324.
      *b*². Head smooth, polished and shining . *P. jerdoni*, p. 324.
    b'. Frontal area indistinct, not well-defined. *P. pissina*, p. 324.

361. **Plagiolepis longipes**, *Jerdon* (Formica), *Madr. Jour. L. & S.* xvii (1851), p. 122, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 414, ☿.

☿. From pale honey-yellow to a light orange-yellow, antennæ and legs a shade paler, abdomen above with a tinge of brown; head, thorax and abdomen very minutely and closely reticulate

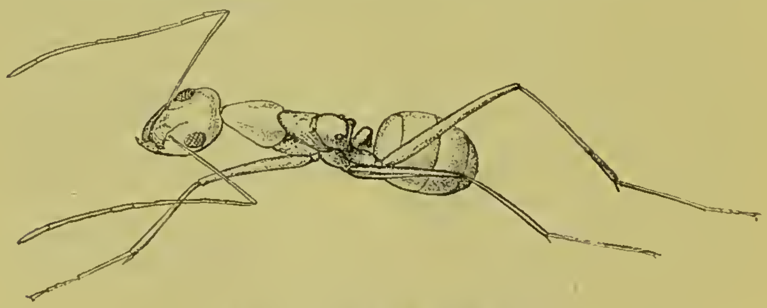

Fig. 97.—*Plagiolepis longipes*, ☿.

punctate, but shining, covered with a few scattered erect yellow hairs; pubescence wanting. Head oval, very rounded posteriorly;

mandibles narrow, acutely dentate along the masticatory margin, with the apices crossing and folded beneath the margin of the clypeus; clypeus convex, carinate, with its anterior margin medially angular; eyes very prominent; antennæ long, filiform, the joints of the flagellum much longer than broad. Thorax narrow, elongate, constricted at the mesonotum; the meso-metanotal suture slightly emarginate; the metanotum rounded, convex and gibbous; legs extremely long and slender. Node of the pedicel thick, low, conical, rounded above; abdomen broadly oval, short and massive.

Length, ☿ 3·5–4·5 mm.

Hab. Throughout our limits except in the hot dry portions of the North-Western Provinces, the Punjab and parts of Central India. Common in Ceylon and Burma.

362. **Plagiolepis moelleri**, n. sp.

☿. Head and thorax deep reddish brown, antennæ and legs lighter red-brown, node of the pedicel and abdomen black; head, thorax and abdomen covered with long soft pubescence, pale yellowish on the front of the head and the thorax, black on the abdomen; pilosity almost entirely wanting, confined to a few scattered erect hairs chiefly on the front of the head and the apical segments of the abdomen. The pubescence on the basal two abdominal segments is thick, and gives the segments an opaque appearance. Head subtriangular, very broad and emarginate posteriorly; mandibles broad, the masticatory margin very oblique, dentate, the teeth very long and acute; clypeus strongly medially carinate, the medial angle on the anterior margin ill-defined; frontal area distinct, antennal carinæ parallel; antennæ comparatively short and stout; eyes comparatively small, placed midway on the sides of the head. Thorax short and broad; pronotum very convex and gibbous; mesonotum seen from above almost circular, convex; meso-metanotal emargination broad and deep; metanotum short and very broad, the basal portion about the same length as the oblique apical portion, into which it passes by a distinct angle; legs short and stout. Node of the pedicel low, transverse, rounded above; abdomen broadly oval, massive.

Length, ☿ 4·5 mm.

Hab. Sikhim (*Möller*).

363. **Plagiolepis wroughtoni**, *Forel.*

Plagiolepis rothneyi, *race* wroughtoni, *Forel, Ann. Soc. Ent. Belg.* xlvi (1902), p. 292, ☿.

☿. Black with, in certain lights, a purple gloss on the abdomen, very smooth and shining, antennæ and legs reddish brown, tarsi yellowish white, mandibles ferruginous. Pilosity and pubescence very sparse; flagellum of the antennæ only somewhat densely pubescent. Head square, slightly emarginate posteriorly; man-

dibles comparatively robust, with a much straighter, not oblique, masticatory margin; clypeus convex, with a very distinct median carina; eyes large, placed somewhat to the front below the middle line of the head. Thorax short and stout, pronotum very convex and vaulted, mesonotum small, seen from above circular; meso-metanotal suture emarginate; metanotum short and broad, the basal portion somewhat flat and nearly as long as the oblique apical portion; legs comparatively short and stout. Node of the pedicel low, flat, transverse above; abdomen massive, much longer than broad.

Length, ☿ 2–2·5 mm.

Hab. Recorded so far only from the Nilgiris (*Wroughton*).

364. **Plagiolepis rothneyi**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 414, 415, ☿.

☿. Black, smooth, polished and shining, the mandibles, antennæ and legs reddish brown; head, thorax and abdomen with sparse, erect, somewhat coarse hairs and a very fine thin pubescence, only to be seen in certain lights. Head without the mandibles nearly square, very slightly emarginate, and a little broader posteriorly than in front; mandibles triangular, the masticatory margin broad, dentate and nearly straight, not so oblique as in *P. longicornis*; clypeus not carinate, convex and tectiform, the medial angle on its anterior margin not well-marked, not covering any portion of the mandibles. Thorax not so broad as the head, the pronotum very convex and rounded in front; mesonotum nearly as long as the pronotum; the meso-metanotal suture very distinct, deep and wide; metanotum large, broad and flat, posteriorly its basal and apical obliquely sloping flat portions about equal. Node of the pedicel low, thick at base, slightly conical and rounded, but broader than long at apex; abdomen very broad, convex and massive, gibbous in front.

Length, ☿ 2·5–4·5 mm.

Hab. Recorded from Bengal (*Rothney*) and Western India (*Wroughton*).

Some of the smaller workers are much lighter in colour, dark chestnut-red instead of black, with proportionately longer heads and larger mandibles with oblique masticatory margins.

365. **Plagiolepis watsoni**, *Forel*.
Plagiolepis rothneyi, *race* watsoni, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 416, ☿.

☿. Very similar to *P. rothneyi*, and about the same size. Differs in having the clypeus distinctly carinate, the mandibles proportionately smaller, the masticatory margin very oblique, the apical tooth long, acute and curved; ocelli entirely wanting; antennæ more slender and with the scape slightly longer. Pilosity and pubescence much more abundant than in *P. rothneyi*. Viewed

from the side the thorax is more level above, the meso-metanotal emargination not being so broad or deep.

Length, ☿ 2·5–4 mm.

Hab. Spread throughout the whole of Burma and Tenasserim, and extending into Siam (*Watson, Allan, Thompson*).

366. **Plagiolepis exigua**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 415, 417, ☿ ♀.

☿. Brownish yellow, with a brown shade on the head and posterior portion of the abdomen; moderately smooth and shining, with minute, somewhat sparse punctures, most distinct on the head and abdomen; pilosity short, sparse and scattered; pubescence fine, thin, white in colour, moderately dense on the head, antennæ, legs and abdomen. Head without the mandibles nearly square, very convex in front, transverse posteriorly; mandibles triangular, the masticatory margin dentate, straight; clypeus comparatively large, strongly convex, and not carinate; antennæ slender, the scape barely extending beyond the top of the head. Thorax narrower than the head; the pronotum convex and rounded in front, but somewhat depressed as compared with *P. rothneyi*, *P. wroughtoni* and other species; the meso-metanotal emargination distinct, the metanotum about as broad as the pronotum, its basal portion very short, much shorter than its oblique apical portion. Node of the pedicel low, somewhat thick at base, rounded above; abdomen comparatively broad, oval, gibbous anteriorly.

"♀. Very narrow, abdomen elongate. Resembles the ☿, but the pubescence is thicker and more abundant. The head and thorax are of a brownish or reddish yellow. Abdomen entirely brownish or of a yellowish brown. Thorax strongly depressed above. Node of the pedicel very low, strongly inclined to the front; wings wanting." (*Forel.*)

Length, ☿ 1–1·5; ♀ 2·5–3 mm.

Hab. Western India (*Wroughton*). Found also in Madagascar.

367. **Plagiolepis dichroa**, *Forel, Rev. Suisse Zool.* x (1902), p. 235, footnote.

☿. Yellow, the head shading to light or sometimes to dark brown; head, thorax and abdomen smooth and shining; pilosity very sparse, almost entirely absent. Head as in *P. exigua*, but much broader posteriorly and proportionately more narrowed anteriorly. Thorax longer, the metanotum transversely concave down the middle. For the rest like *P. exigua*, but larger and proportionately more slenderly built.

Length, ☿ barely 2 mm.

Hab. Sikhim (*Möller*), Bengal (*Rothney*).

I am not very certain whether one rather damaged specimen received from Mr. Möller is this species. Dr. Forel's short description agrees fairly well with the Sikhim specimen, only the latter seems smaller, scarcely 2 mm. long.

368. **Plagiolepis jerdoni**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 415 & 416, ☿.

☿. Pitch-black or brownish black, the antennæ and the tibiæ and tarsi of the legs brownish yellow, the coxæ and femora dusky black; head, thorax and abdomen subopaque, almost without pilosity, but with moderately abundant whitish pubescence, thin and silky; there are a few erect hairs on the front of the head and the apex of the abdomen. Head without the mandibles a little longer than broad, transverse, widely but very slightly emarginate posteriorly, the lateral angles of the occiput somewhat prominent; mandibles subtriangular, rather small, clypeus shining, convex, carinate; antennæ slender, extending slightly more beyond the top of the head than in *P. exigua*. Thorax short and broad; pronotum large, convex; mesonotum from above circular, convex; meso-metanotal emargination well-marked; metanotum nearly as broad as the pronotum, basal portion very short, not half the length of the oblique, declivous apical portion. Node of the pedicel low, transverse above, strongly inclined to the front; abdomen oval.

Length, ☿ 1·3–1·5 mm.

Hab. Western India (*Wroughton*); Travancore (*Ferguson*).

369. **Plagiolepis rogeri**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 415 & 417, ☿.

☿. Very similar to *P. jerdoni* in colour, but the head is very finely and very distinctly longitudinally striate, and both pilosity and pubescence are more abundant, the latter especially dense on the scape of the antennæ and the tarsi. Head slightly longer than in *P. jerdoni*, with the posterior margin transverse but not emarginate and with the lateral occipital angles less prominent; mandibles triangular, broader; clypeus more distinctly carinate, opaque, not shining. Thorax narrower, the pro- and mesonotum not so convex, the meso-metanotal emargination shallow and not so well-marked as in *P. jerdoni*. Node of the pedicel and abdomen similar to those of *P. jerdoni*, the former very strongly inclined to the front.

Length, ☿ 1·5 mm.

Hab. Western India, Kanara (*Wroughton*); Tenasserim, Mergui (*Bingham*).

370. **Plagiolepis pissina**, *Roger, Berlin. ent. Zeit.* vii (1863), p. 162, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 417.

"☿. Nearly 1·5 mm. long. Very similar to *P. pygmæa*, Latr.; very shining, pitch-black or pitch-brown, legs brownish, antennæ more yellow; one specimen is light brown with blackish abdomen. Pilosity very sparse, consisting of one or two erect hairs on the abdomen, and a few short adpressed hairs on the head. Mandibles

reddish yellow, with a few sharp brown teeth. The clypeus bears an impressed line parallel to its anterior margin, in the middle it is strongly convex. Frontal area indistinct. Head towards the front with very scattered fine punctures, or nearly smooth. The abdomen appears to be without sculpture." (*Roger.*)

Hab. Ceylon. Unknown to me.

Genus PRENOLEPIS.

Formica, pt., *Latr. Hist. Nat. Fourm.* 1802, p. 113, ☿.
Prenolepis, *Mayr, Eur. Form.* 1861, p. 52.

Type, *P. nitens*, Mayr, from Europe.

Range. Generally distributed through both hemispheres.

☿. Mandibles moderately broad, dentate, the apical tooth long, curved and acute; clypeus proportionately large, convex, its anterior margin slightly indented in the middle so as not to cover the mandibles; antennal carinæ very short; antennæ 12-jointed, placed very close to the posterior margin of the clypeus, the scape remarkably long and slender; antennal and clypeal hollows separate; frontal area not sharply defined; ocelli wanting; eyes placed above the middle of the sides of the head. Thorax with the pro-meso- and meso-metanotal sutures very distinct, the pro- and mesonotum rounded and convex; the metanotum as broad as the mesonotum or broader, its basal portion convex, its apical portion truncate, only slightly convex, almost flat; the thorax viewed sideways shows a deep emargination at the meso-metanotal suture; legs moderately long, slender. Pedicel short, the node somewhat quadrangular, inclined forwards; abdomen broad anteriorly, very high and convex, somewhat overhanging the pedicel.

♀. Head small in proportion to the very massive thorax and abdomen; mandibles, clypeus and antennæ as in the ☿; ocelli distinct. Thorax: the pronotum vertical, not forming part of the dorsum; mesonotum broad, lightly convex, bearing two short, parallel, widely separated, longitudinally impressed lines posteriorly; scutellum large, with a shallow impressed short furrow in the middle; metanotum rounded. Node of the pedicel slightly thicker than in the ☿, very low and almost close to the forward bulge of the remarkably large and massive abdomen.

♂. As small as or smaller than the ☿, slender. Head from in front oval, posteriorly narrowed and arched; mandibles short, not hidden under the clypeus; clypeus as in the ☿, but the anterior margin rounded; antennæ 13-jointed, remarkably long, very slender and filiform; eyes and ocelli very large, the former placed in the middle of the sides of the head. Thorax massive; legs very long and slender; wings long and ample, with one marginal and one cubital cell. External genitalia small and narrow.

Key to the Species.

☿ ☿.

a. Thorax with mesonotum remarkably long, strongly constricted, cylindrical.......... *P. melanogaster*, p. 327.
b. Thorax with mesonotum shorter, not or only slightly constricted, not cylindrical.
  a'. Scape of antennæ remarkably long, extending beyond top of head by more than half its length.
    a^2. Thorax not constricted at the meso-metanotal suture.................. *P. longicornis*, p. 326.
    b^2. Thorax distinctly constricted at the meso-metanotal suture.
      a^3. Head distinctly broader posteriorly than in front .... *P. naorojii*, p. 331.
      b^3. Head as broad in front as posteriorly. *P. birmana*, p. 331.
  b'. Scape of antennæ extending beyond top of head by less than half its length.
    a^2. Head oval, narrowed posteriorly. Length under 2 mm. .... *P. taylori*, p. 328.
    b^2. Head more or less quadrangular, broad posteriorly. Length 2 mm.
      a^3. Head highly polished, smooth and shining, not pilose; only a few scattered hairs on clypeus and mandibles .... *P. bengalensis*, p. 328.
      b^3. Head not polished, only slightly shining, pilose or pubescent.
        a^4. Head above antennæ with fairly abundant erect hairs.
          a^5. Clypeus very convex, rounded, about as broad as long ...... *P. indica*, p. 329.
          b^5. Clypeus less convex, transverse, twice as broad as long ...... *P. yerburyi*, p. 329.
        b^4. Head above base of antennæ without erect hairs; only a fine but very distinct pubescence .... *P. aseta* *, p. 331.

371. **Prenolepis longicornis**, *Latr.* (Formica), *Hist. Nat. Fourm.* 1802, p. 113, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 406 & 407, ☿ ♂.

☿. Dull coppery brown, mandibles, antennæ and legs pale whitish brown, the articulations of the legs and of the segments of the abdomen still paler; head, thorax and abdomen with fairly abundant, long, erect, somewhat coarse hairs. Head oval, as broad in front as posteriorly, vertex rounded, not transverse, sides of the head straight; eyes very large and prominent: mandibles small and weak, the masticatory margin dentate with 5 or 6 teeth; clypeus rounded, prominently convex; antennæ filiform, extremely long. Thorax elongate, rounded above, the sutures distinct; viewed from the side the thorax is lightly

* *P. smythiesi*, p. 330, is omitted from the key, the ☿ being unknown.

emarginate at the mesonotum; metanotum rounded, the basal portion passing into the apical portion with a gentle curve; legs remarkably long and slender. Node of the pedicel not so broad as high, rounded above; abdomen anteriorly gibbous, oval, massive.

♀. Proportionately very much larger than the ☿, similar in colour but slightly darker, the apical margins of the abdominal segments markedly pale; head, thorax and abdomen entirely devoid of the erect hairs so conspicuous in the ☿, but covered with a fairly abundant silky pale pubescence. Head subtriangular, very convex, broader posteriorly than in front. Ocelli present and distinct. Thorax: the pronotum vertical, forming no part of the dorsum; mesonotum broad and convex; scutellum slightly compressed, medially longitudinally furrowed. Node of the pedicel low and inconspicuous, completely overhung by the very large massive abdomen.

♂. Similar to the ☿, but much paler in colour, with the same erect rather coarse pilosity. Head oval, eyes and ocelli very large and prominent; mandibles narrow and feeble; clypeus as in the ☿. Thorax and abdomen moderately massive, the latter elongate, oval, convex above; the external genitalia large and prominent.

Length, ☿ 2·5–3; ♀ 5·5; ♂ 3 mm.

Hab. Throughout our limits, and introduced and spread over all tropical countries. This ant is not uncommon in hot-houses and large conservatories even in Europe.

372. **Prenolepis melanogaster**, *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 476, ☿.

☿. Head, thorax, legs and node of pedicel bright orange-brown, abdomen jet-black; the whole insect covered with abundant long, erect, yellow hairs; head and thorax feebly punctured, subopaque; abdomen polished and shining. Head without the mandibles

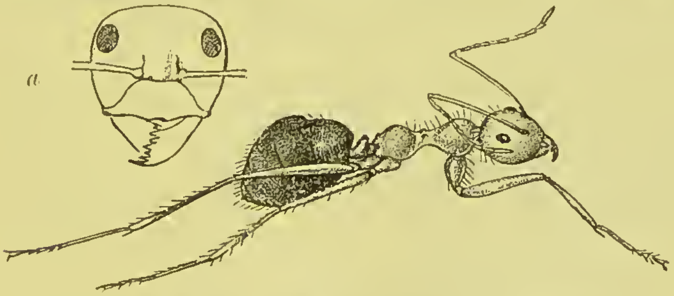

Fig. 98.—*Prenolepis melanogaster*, ☿. *a.* Head.

broader than long, viewed from the front almost circular, the cheeks strongly convex; mandibles large, subtriangular, the masticatory margin broad, very oblique, strongly dentate, the apical tooth very long and curved; clypeus convex, broader than high, its anterior margin almost straight, only slightly rounded and

slightly incised in the middle; frontal area distinct, above it on the front a short but distinct longitudinal carina; antennæ long, especially the scape, which extends beyond the top of the head by more than half its length. Thorax with the pro- and metanotum rounded, gibbous; the mesonotum very long, strongly constricted and cylindrical. Viewed from the side the thorax has a form somewhat like that of a dumbbell; thoracic sutures visible but not very distinct above; legs long and robust. Node of the pedicel strongly inclined forwards, somewhat conical, rounded above; abdomen remarkably large, highly raised, convex and gibbous anteriorly, conical posteriorly.

Length, ☿ 5·5 mm.

Hab. Shan Hills, Upper Burma, at 5000 ft.; Karennee (*Fea*). Described from three specimens procured by me.

373. **Prenolepis taylori**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 407 & 410, ☿ ♀ ♂.

☿. Pale yellow, very minutely punctured, subopaque and only slightly shining; head, thorax and abdomen covered with sparsely scattered, short, semi-erect pale hairs. Head oval, longer than broad, very convex in front, the vertex rounded; mandibles narrow, the masticatory margin oblique; clypeus broad, its anterior margin arched; antennæ somewhat short, the scape not extending beyond the top of the head by more than about one-third of its length; eyes proportionately rather small, placed laterally below the middle line of the side of the head. Thorax elongate, the pro-meso- and meso-metanotal sutures distinct, a well-marked incision or narrow emargination at the latter, but the mesothorax not constricted; legs moderately long. Node of the pedicel low, inclined forwards, flat, rounded above; abdomen massive, convex above, gibbous in front.

"♀. Dark brown, mandibles, antennæ, legs and node of the pedicel reddish yellow. Hairs on scape of the antennæ brownish. Node of the pedicel thick, strongly inclined." (*Forel.*)

"♂. Head oval, slightly longer than broad. Basal portion of the metanotum horizontal, a little longer than the sloping apical portion. Colour as in *P. indica* ♂." (*Forel.*)

Length, ☿ and ♂ under 2; ♀ 3·5–4 mm.

Hab. Recorded from Bengal (*Taylor*), Western India (*Wroughton*), and Ceylon (*Yerbury*).

374. **Prenolepis bengalensis**, *Forel.*

Prenolepis bourbonica, *Forel, race* bengalensis, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 406 & 407.

☿. Dark castaneous brown, shining, covered with long and fairly abundant, erect, reddish hairs, more dense on the abdomen than on the rest of the body; mandibles, antennæ and legs paler brown. Head not pilose, very convex, the cheeks and the occiput transverse, broad; mandibles subtriangular, armed

with 5 acute teeth, the apical tooth long and curved: clypeus broader than long, medially vertically carinate, its anterior margin transverse; antennæ short, the scape barely extending beyond the top of the head. Thorax short and broad, deeply emarginate at the meso-metanotal suture; the apical portion of the metanotum very broad and flat; legs robust, somewhat short. Node of the pedicel thick, quadrangular, transverse above; abdomen massive, very convex above, short and broad, the anterior hollow that receives the node of the pedicel not well-marked.

Length, ☿ 2·5–3 mm.

Hab. Bengal (*Rothney*); and throughout Burma and Tenasserim (*Watson & Bingham*).

375. **Prenolepis indica**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 407, 408, & 409, ☿ ♀ ♂.

☿. Brownish yellow, front of the head darker, mandibles, antennæ and legs paler, covered with rather abundant short, thick, erect brown hairs, most dense on the front of the head and on the abdomen; pubescence extremely thin and sparse or wanting, only to be seen in certain lights. Head as broad as long, moderately convex in front, transverse posteriorly, the posterior lateral angles not produced, but distinct. Mandibles attenuate at base, the masticatory margin oblique, armed with 5 teeth; clypeus broad, medially vertically subcarinate; antennæ moderately stout and long, the scape extending beyond the top of the head by about one-quarter of its length. Thorax stout, deeply emarginate at the meso-metanotal suture; the pronotum and mesonotum broad and convex, the basal portion of the metanotum very short, the apical portion obliquely truncate, broad and flat. Node of the pedicel low, flat, transverse above, fitting into a hollow in the front of the abdomen, the latter oval, moderately broad.

♀. Dark brown; mandibles, flagellum of the antennæ and the articulations of the legs paler. Wings hyaline tinged with brown.

♂. Head and the mesonotum of the thorax brownish yellow, abdomen darker, rest of the thorax and legs light yellow. "External genital valves narrowed at apex. Median valves very large, the exserted external portion very long and pointed, the internal much shorter and obliquely truncate at apex. Both are armed with strong black teeth on the peripheral halves of the margins opposite each other, and are straight and narrow. Internal valves oval." (*Forel.*)

Length, ☿ 2–3; ♀ 5; ♂ 2 mm.

Hab. Bengal (*Rothney*), Western and Central India (*Wroughton*), Ceylon (*Yerbury*).

376. **Prenolepis yerburyi**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 406, 408, & 409, ☿ ♂ ♀.

☿. Light brown, antennæ and legs slightly paler brown,

covered with a sparse minute pubescence and abundant, rather thick, erect brown hairs, somewhat dense on the head and abdomen, sparse on the thorax. Head broad, about as broad as long without the mandibles, transverse, almost emarginate posteriorly; mandibles broad, punctured, each with 4 teeth, the apical tooth long, acute and slightly curved; clypeus strongly convex, broader than long; antennæ of moderate length, the scape extending beyond the head by about one-third of its length; eyes placed more to the front of the head than in the other species. Thorax broad, the meso-metanotal emargination distinct but not so wide or deep as in *P. bengalensis*; the metanotum rounded, the basal portion not nearly so long as in *P. indica*. Node of the pedicel somewhat flat, laminate and low, not nearly so conspicuous as in *P. indica*; abdomen broad and massive.

"♀. Similar to the ☿, and pilose. Like all ♀ *Prenolepis* it is nearly impossible to distinguish this species from the others. Dark brown all over. Wings strongly shaded with brown." (*Forel.*)

"♂. Valves of the external genitalia very long, black, chitinous (nearly twice as long as broad without the appendix), terminating in a very long appendix (nearly as long as the valve), very narrow, slightly curved and rounded at apex, which is broader than the basal portion, below terminated by a triangular protuberance. Between the protuberance and the appendix there is a notch less deep than in *P. taylori*. . . . Blackish, very shining, tarsi and the articulations of the femora testaceous. Flagellum of the antennæ and coxæ brown. Legs, scapes and mandibles of a dark brown, as are the sides of the thorax. Head broad, broader posteriorly than in front. The basal face of the metanotum merged into the declivous apical face. Thorax broader than in *P. bourbonica*. Wings fuscous." (*Forel.*)

Length, ☿ 2·5–3·5; ♀ 4–4·5; ♂ 2·5 mm.

Hab. Ceylon (*Yerbury*); Southern India, the Nilgiris (*Wroughton*).

377. **Prenolepis smythiesi**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 408 & 410, ♀ ♂.

♀. Head and thorax dull red, abdomen brown; mandibles, antennæ, scutellum, basal margin of median segment and the legs pale yellow; head, thorax and abdomen densely pubescent and covered with scattered erect pale hairs, very minutely and closely punctured, opaque; head subtriangular, broad posteriorly; mandibles comparatively broad and strong, the masticatory margin with 5 or 6 teeth; clypeus very large, prominent, convex; eyes prominent; antennæ slender, filiform, the scape extending beyond the top of the head by less than half its length, the joints of the flagellum short, very little longer than they are broad; ocelli distinct. Thorax massive; pronotum vertical, not forming part of the dorsum; mesonotum and scutellum broad and convex; median segment oblique. Node of the pedicel depressed much

below the level of the thorax and abdomen, the latter very massive and gibbous in front. Wings subhyaline, nervures brownish yellow.

♂. Brownish yellow, antennæ and legs paler yellow. Head oval; eyes and ocelli very prominent. Thorax a little broader than the head, the mesonotum broad and gibbous in front; wings as in the ♀. "Genital valves small, pale in colour. The exterior valves constricted at the apex, with a very narrow appendix above, and below terminating in a slightly protuberant angle." (*Forel.*)

☿. Unknown.

Length, ♀ a little over 4; ♂ 1·5 mm.

Hab. Recorded as yet only from Dehra Dun, North-West Provinces of India (*Smythies*).

378. **Prenolepis birmana**, *Forel, Ann. Soc. Ent. Belg.* xlvi (1902), p. 291.

☿. Head and abdomen black; thorax fuscous dark brown, antennæ and legs a shade paler; apex of the mandibles and tarsi yellowish; the metanotum posteriorly polished and shining, the remainder of the head, thorax and abdomen more or less opaque or subopaque, finely and very closely reticulate, the abdomen in certain lights shining in parts. Pilosity moderately long and abundant, the tibiæ and scapes of the antennæ with more or less dense recumbent hairs. Head without the mandibles rectangular, with a distinct posterior margin; mandibles narrow, the masticatory margin armed with 5 teeth; clypeus narrow, convex; antennæ long and slender; eyes small, placed a little lower than the middle of the head. Thorax as in *P. longicornis*, but more stoutly built, the meso-metanotal suture deeply impressed. Node of pedicel and abdomen as in *P. longicornis*, but the latter more truncate and not projecting anteriorly so much over the node.

Length. ☿ 3 mm.

Hab. Tenasserim, Moulmein (*Hodgson*); Tavoy (*Bingham*).

379. **Prenolepis naorojii**, *Forel, Ann. Soc. Ent. Belg.* xlvi (1902), p. 290.

☿. Head, thorax, the coxæ, femora and tibiæ of the legs yellowish brown; abdomen brown; antennæ and the tarsi pale yellowish; very smooth, polished, and shining, in certain lights the abdomen minutely reticulate; pilosity yellowish, fine and remarkably long, the scape of the antennæ and the tibiæ with shorter oblique hairs. Head broadly oval; mandibles pilose, shining, the masticatory margin armed with 6 teeth; clypeus convex, broad, anteriorly rounded, medially longitudinally carinate; antennæ proportionately as long almost as in *P. longicornis*, the scape extending beyond the occiput by more than half its length;

eyes remarkably large and prominent, situated above the middle of the head. Thorax rather long, the pro- and mesonotum forming one convexity subequal with the metanotum forming the other convexity, the meso-metanotal suture dividing them broad and well-impressed. Node of pedicel somewhat thick, inclined forwards; abdomen broad and short, anteriorly somewhat truncate and gibbous, with a very distinct groove for the reception of the node.

Length, ☿ 3·5 mm.

Hab. Recorded from the North-West Provinces, India, and from Assam (*Smythies*).

380. **Prenolepis aseta**, *Forel, Ann. Soc. Ent. Belg.* xlvi (1902), p. 292.

☿. Head and abdomen brownish yellow, thorax dull reddish yellow, antennæ and legs dingy yellow of a lighter shade than the thorax; head, thorax and abdomen lightly minutely punctured, reticulate; pilosity of a pale yellow, rather sparse, pubescence fine and short, giving a pruinose appearance to the head and abdomen, less so to the thorax. Head rectangular, the sides straight, a little longer than broad, posteriorly slightly emarginate; mandibles finely sculptured, armed with 6 teeth; clypeus polished and shining, very convex and subcarinate down the middle, with the margin anteriorly slightly emarginate; antennæ long, but not so long proportionately as in *P. longicornis*, the scape passing beyond the top of the head by about one-fourth of its length; eyes not prominent, placed about the middle of the sides of the head and a little to the front. Thorax in profile somewhat resembling the thorax in species belonging to the genus *Iridomyrmex*, Mayr; the thoracic suture distinct but feeble, the meso-metanotal suture slightly emarginate, and containing two somewhat prominent stigmata; metanotum raised a little, the basal portion passing by a short and rounded curve to the apex. Pedicel as in all species of *Prenolepis*; abdomen rounded and gibbous in front, with a shallow groove for reception of the node of the pedicel.

Length, ☿ 2·5 mm.

Hab. Sikhim, Darjeeling (*Wroughton*).

Genus **ACROPYGA**.

Acropyga, *Roger, Berl. ent. Zeit.* vi (1862), p. 242.

Type, *A. acutiventris*, Roger, from Ceylon.

Range. Indo-Malayan region.

☿. Head quadrangular, without the mandibles nearly square, slightly emarginate posteriorly, convex in front; mandibles somewhat narrow, the masticatory margin very oblique, and armed with 5 teeth; clypeus convex, broader than long, truncate posteriorly, the angles rounded, anteriorly lightly and widely emarginate, not covering the mandibles; antennal carinæ short, somewhat wide apart and parallel; antennæ 11-jointed; the

scape is short, reaching to about the top of the head; eyes very small, as in *Pseudolasius*. Thorax short, rounded and convex above, the pro-meso- and meso-metanotal sutures distinct; the thorax viewed from the side is widely emarginate at the latter suture; legs stout, long, cylindrical, the basal joint of the tarsus more than half the length of the tibia. Node of the pedicel flat, transverse, rounded above; abdomen very long, rapidly narrowing posteriorly, the apex acute.

♀. Very similar to the ☿, the head proportionately broader, more convex in front, the eyes larger, the clypeus transverse anteriorly. Thorax massive; pronotum vertical, not forming any portion of the dorsum; the mesonotum and broad scutellum slightly convex; metanotum with a rounded slope to apex. Node of the pedicel and the abdomen as in the ☿, but the former thicker at base, the latter longer and more massive. Ocelli large and close together, planted in little hollows. Wings: fore wing with one cubital cell, the radial cell very long.

381. **Acropyga acutiventris**, *Roger, Berl. ent. Zeit.* vi (1862), p. 243, ☿ ♀.
Plagiolepis flava, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 699, ☿.

☿ and ♀. Deep yellow or reddish yellow all over; eyes jet-black, in strong contrast with the yellow of the head and body; head, thorax and abdomen very minutely rugulose, but shining,

Fig. 99.—*Acropyga acutiventris*, ☿. *a*. Head.

covered somewhat thickly with long erect yellow hairs and a dense pale yellow pubescence, very marked on the antennæ and legs. For the rest the characters of the genus.

Length, ☿ 4–5·5; ♀ 6·5 mm.

Hab. Recorded from Western India (*Wroughton*), Ceylon (*Yerbury*), Burma (*Fea*), and the Nicobars (teste *Mayr*).

Genus FORMICA.

Formica, *Linn. Syst. Nat.* ed. 10 (1758), p. 579.

Type, *F. rufa*, Linn., from Europe.

Range. Both hemispheres.

☿. Mandibles triangular, with a broad dentate masticatory margin, the apical tooth acute and curved; clypeus broad and high;

maxillary palpi with 6, labial with 4 joints, the 4th joint of the maxillary palpi a little longer than the 5th; frontal area small, subtriangular and distinct; antennal carinæ wide apart, more or less curved outwards, never laminate; antennæ 12-jointed, springing from just behind the posterior margin of the clypeus; the scape and flagellum filiform, the latter not sensibly thickened towards the apex; eyes placed above the middle line of the head and somewhat to the front, ocelli present; head viewed from the side strongly convex in front. Thorax a little narrower than the head, the pro- and mesonotum rounded, convex; the pro-meso- and meso-metanotal sutures well-marked, the thorax more or less constricted at the latter suture; legs moderately long and slight, claws simple. Pedicel one-jointed, with an erect squamiform node; abdomen comparatively short, globose.

♀. Similar to the ☿, larger; wings ample, the fore wing with one cubital and one discoidal cell.

♂. Mandibles flat, the masticatory margin distinct, ending in one to four or five teeth; the palpi and clypeus as in the ☿; the antennal carinæ short, divergent posteriorly; the frontal area as in the ☿; the antennæ 13-jointed, springing as in the ☿ from just behind the posterior margin of the clypeus. Thorax massive, broad in the middle, the mesonotum ample and convex, the scutellum broad and prominent; wings as in the ♀. Node of the pedicel rather low, cuneiform and square, above generally emarginate; abdomen above depressed, somewhat flat, the apical segments gradually smaller. Pencilli present, outer genital laminæ knife-shaped, inner without appendix.

Key to the Species.

a. Anterior border of clypeus not emarginate.
  a'. Fuscous or brownish red, head darker than rest of body.
    *a*². Abdomen opaque, not shining .... *F. fusca*, p. 336.
    *b*². Abdomen polished and shining........ *F. gagates*, p. 336.
  b'. Head and thorax clear yellowish red; abdomen light fuscous brown.
    *a*². Node of pedicel lightly but distinctly convex in front, flat or concave posteriorly .... *F. truncicola*, p. 334.
    *b*². Node of pedicel flat or a little convex, both anteriorly and posteriorly ...... *F. rufibarbis*, p. 335.
b. Anterior border of clypeus emarginate ...... *F. sanguinea*, p. 336.

382. **Formica truncicola**, *Nyl. Acta Sc. Fennic.* ii (2), 1847, p. 907, ☿ ♀; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 402, ☿.

☿. Head with the mandibles and antennæ, thorax, legs and node of pedicel clear light or yellowish red, abdomen fuscous brown; head, thorax and abdomen covered with short erect light-red hairs, sparse on the head and thorax, fairly abundant on the abdomen, and a fine minute pubescence, giving the insect a silky

shimmering appearance. Head, thorax and abdomen minutely but very closely punctured. Mandibles broad, with the teeth on the masticatory margin minute, in certain lights longitudinally finely striate; clypeus convex medially, vertically carinate, its anterior margin arched; frontal area smooth and shining; antennæ long and slender, the scape extending well beyond the top of the head. Thorax: the constriction at the meso-metanotal suture deep, the metanotum viewed from the side regularly arched. Node of the pedicel laminate, with the sides and upper margin sharp, the latter scarcely arched, transverse; abdomen somewhat depressed, almost as broad as long.

♀. Very similar to the ☿, larger; the thorax above in some specimens brownish, abdomen darker than in the ☿; wings subhyaline, somewhat lacteous.

Length, ☿ 5–7; ♀ 9 mm.

Hab. Procured at Lahoul, on the frontier of Tibet (*Sage*). Widely spread in Northern and Central Europe and Northern Asia.

383. **Formica rufibarbis**, *Fabr. Ent. Syst.* ii (1793), p. 355, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 403, ☿.
? Formica fraterna et F. defensor, *Smith, 2nd Yark. Miss.* 1878, p. 11, ☿ ☿*.

☿. In colour very similar to *F. truncicola*, but less pilose, having only a few scattered hairs on the abdomen and front of the head. Pubescence sericeous, dense, giving the insect a much more opaque look than *F. truncicola*; frontal area not shining, opaque.

♀. Closely resembles the ☿. Wings slightly more hyaline than in *F. truncicola*.

Length, ☿ 5–6; ♀ 8 mm.

Hab. Himalayas over 10,000 ft. (*Smythies*), Sikhim (*Möller*), Lahoul, Dharmsála (*Sage*). Outside our limits found both in Europe and North America.

Var. *clara*, Forel, has the head and thorax of a brighter yellowish red.

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* Smith, *l. c.*, also describes the following, but the description is wholly insufficient for the identification of the species he had before him:—"Formica candida. *Femina.—F. nigra nitidissima; mandibulis, antennis, pedibusque rufescentibus; squama lata, subtriangulariter, margine supra rotundato.*—Shining black, the mandibles, antennæ and legs ferruginous; the latter slightly fuscous above, as are also a few of the apical joints of the flagellum above. The head the width of the thorax; the clypeus with a sharp central carina, the frontal area semiopaque and with a fine cinereous pile, which also covers the squama, legs, and thorax on the sides and beneath. Abdomen oblong-ovate, very smooth and shining, and with a sprinkling of pale hairs at the apex; the extreme apex pale testaceous. Female, length $3\frac{1}{2}$ lines (7 mm.).—*Hab.* On the road across the Pamir from Sarikol to Panja (April and May)."

This may possibly be *F. fusca*, Linn., or a form of the same, or of *F. gagates*, Latr.

384. **Formica fusca**, *Linn. Syst. Nat.* ed. 10 (1758), p. 580; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), pp. 402, 403.

☿. Dull fuscous red; abdomen concolorous with the head and thorax, not darker, very opaque and with dense silky shimmering pubescence. Head shorter and a little broader than in *F. truncicola*; clypeus very acutely medially carinate; thorax with the constriction at the meso-metanotal suture very deep; node of the pedicel somewhat thick, more convex in front, more or less flat posteriorly; abdomen depressed, broad.

Length, ☿ 4–5 mm.

Hab. Himalayas, hills north of Mussoorie (*Rothney*), Sikhim (*Möller*); Central Provinces, Pachmarhi (*Schurr*). Outside our limits widely spread through Europe, North Africa, Northern Asia and North America.

This species seems to be found at a lower level in the Himalayas than any other of the genus. I have seen no ♀ or ♂ from India.

385. **Formica gagates**, *Latr. Ess. Hist. Fourm. Fr.* (1798), p. 36: *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 402.

☿. Dark castaneous or piceous brown, smooth and shining, with a few scattered erect hairs on the front of the head and on the posterior half of the abdomen. Head narrower, with the cheeks slightly flatter and straighter than in *F. fusca*; clypeus comparatively large, convex, medially vertically carinate; this carina in all specimens from India that I have seen is slight, not acute, and medially interrupted. Thorax above less deeply emarginate at the meso-metanotal suture than in *F. fusca*. Node of the pedicel convex in front, flat posteriorly, its upper margin rounded, remarkably attenuate and sharp; abdomen narrower, less depressed and more convex above than in *F. fusca*.

Length, ☿ 3·5–5 mm.

Hab. Lahoul, frontier of Tibet (*Sage*). Northern and Central Europe, Northern Asia and North America.

386. **Formica sanguinea**, *Latr. Ess. Hist. Fourm. Fr.* 1798, p. 37; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 402, ☿.

☿. Head, thorax and legs a clear light red, slightly fuscous on the head; abdomen fuscous brown or black. Head, thorax and abdomen dull and semiopaque, with a few scattered erect red hairs on the front of the head, on the underside and at the apex of the abdomen; pubescence extremely minute and thin, giving the insect a silky appearance. Head without the mandibles nearly square; mandibles strong, broad and very clearly dentate; clypeus convex, medially vertically carinate and incised or emarginate at the apex of the carina; antennæ more massive than in *F. truncicola*, *F. fusca*, &c.; head posteriorly distinctly widely emarginate. Thorax narrower than the head, the emargination at the meso-metanotal suture deep and broad. Node of the pedicel sub-

triangular, slightly biconvex, very broad and transverse above, the lateral angles rounded; abdomen depressed, broad, as broad as long.

Fig. 100.—*Formica sanguinea*, ☿. *a.* Head; *b.* Maxillary palpus.

♀. Very similar to the ☿ but larger, the head, thorax and abdomen a lighter brighter yellow, the abdomen slightly darker, in greater contrast to the colour of the head and thorax.

Length, ☿ 6–7; ♀ 9–9·5 mm.

Hab. Lahoul, frontier of Tibet (*Sage*). Northern Europe, Asia and America.

I have seen no ♂ of this species from India.

Genus PSEUDOLASIUS.

Formica, pt., *Smith, Jour. Linn. Soc.* v (1861), p. 68, ♀.
Pseudolasius, *Emery, Ann. Mus. Civ. Gen.* xxiv (1886), p. 244.

Type, *P. familiaris*, Smith, originally described from the Celebes.

Range. Indo-Malayan region.

☿ *maj.* Mandibles powerful, subtriangular, armed with four teeth, the innermost broad, bimucronate, the others acute; clypeus more than twice as broad as high, convex in the middle, depressed at the sides, its anterior margin transverse; frontal area not clearly defined, clypeal and antennal hollows confluent; antennal carinæ wide apart, rather short, parallel; antennæ 12-jointed, somewhat short, the scape stout, the flagellum gradually thickened to the apex; eyes small, ocelli absent; head massive, square, deeply emarginate posteriorly. Thorax short, stout, not so broad as the head, the pronotum rounded, convex; viewed from above the mesonotum is circular, the metanotum obliquely truncate, the basal portion much shorter than the oblique apical portion; thoracic sutures distinct; legs moderately long and stout. Node of the pedicel quadrangular, slightly emarginate above, posteriorly fitting into a hollow in the abdomen; abdomen short, broad and convex, somewhat gibbous in front.

☿ *min.* Much smaller, very similar; mandibles with the masticatory margin more oblique; clypeus convex, anteriorly transverse; clypeal and antennal hollows not so clearly confluent as in the

☿ *maj.*; antennæ proportionately more slender and longer, the scape extending a little beyond the top of the head.

♀. Head not so broad as the thorax; eyes much larger than in the ☿; ocelli present; antennæ 12-jointed, proportionately longer than in the ☿ *maj.* Thorax and abdomen massive. Node of the pedicel very low, sunk between the thorax and abdomen. Wings long, rather narrow; fore wing with one very large cubital and one marginal cell; discoidal cell obsolete.

387. **Pseudolasius familiaris**, *Smith* (Formica), *Jour. Linn. Soc.* v (1861), p. 68, ♀.

☿ *maj.* Reddish yellow to creamy buff, shaded with reddish brown, abdomen almost entirely reddish brown; head, thorax and abdomen very minutely but closely reticulate-punctate, and covered copiously with minute piligerous tubercles, the hairs fairly long,

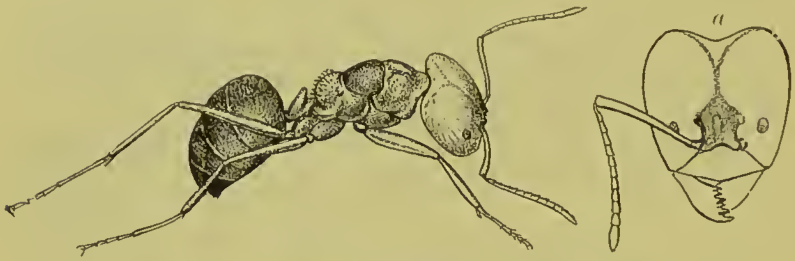

Fig. 101.—*Pseudolasius familiaris*, ☿ maj. *a.* Head.

erect, and glistening yellow; pubescence fine, short and silky, very dense on the abdomen, giving it in certain lights a striate appearance. For the rest the generic characters.

☿ *min.* Similar, smaller, with proportionately longer antennæ, and lighter, paler in colour.

♀. Varying from reddish yellow to reddish brown; wings hyaline, with a silky pubescent appearance, nervures brown. Pilosity and pubescence as in the ☿ *maj.*

Length, ☿ *maj.* 6–7; ☿ *min.* 3·5–4; ♀ 7–8 mm.

Hab. Sikhim at 4000 ft. (*Möller*); Burma, the Karen Hills and Shan plateau from 3000 to 6000 ft. (*Fea & Craddock*).

Genus LASIUS.

Formica, pt., *Linn. Syst. Nat.* ed. 10 (1758), p. 580.
Lasius, *Fabr. Syst. Piez.* 1804, p. 415.

Type, *L. niger*, Linn., from Europe; a widespread Palæarctic and Nearctic species.

Range. Temperate zones of both hemispheres.

☿. Mandibles short, elongate, triangular, masticatory margin dentate and somewhat oblique, the apical tooth long, curved and acute; clypeus trapeziform, convex from side to side (in the

Indian species more or less medially vertically carinate), its anterior margin rounded, posterior margin distinct; frontal area not distinctly limited, about twice as broad as high; antennal carinæ short, wide apart, parallel and vertical; antennæ 12-jointed, originating close to the hinder margin of the clypeus; eyes of moderate size; ocelli present, but not distinct, very small. Thorax: the pronotum rather short, strongly rounded, the mesonotum broad, convex; metanotum short, the basal level portion about half the length of the obliquely sloping flat apical portion; the pro-mesonotal suture very distinct; the thorax at the meso-metanotal suture deeply emarginate; legs somewhat short and stout, claws simple. Pedicel with a small quadrangular, more or less laminate node; abdomen massive, broadly oval, not produced in front or overhanging the pedicel.

♀. Head and pedicel as in the ☿; ocelli larger and more distinct. Thorax very massive, the pronotum short, vertical, not forming part of the dorsum; mesonotum very large, convex; scutellum broad, somewhat flat; metanotum short, rounded posteriorly; abdomen large, oval.

"♂. Mandibles broad, the masticatory margin acute, with only one apical tooth, or the whole masticatory margin dentate. Antennæ 13-jointed, the flagellum filiform, the joints nearly equal in length, the 1st joint thicker than the others. Antennal carinæ short, diverging posteriorly. Genitalia very small on the under side of the abdomen, covered by the tectiform dorsum of the apical abdominal segments. The exterior genital plates narrowing towards the apex, twice as long as at the base, broad, and the rounded apical plate crescentic. Ventral plate not emarginate." (*Mayr.*)

Key to the Species.

a. Front of the head with a medial, longitudinal, impressed line or furrow.
- *a'*. Joints 2–10 of the flagellum of the antennæ longer than they are broad. . . . *L. himalayanus*, p. 340
- *b'*. Joints 2–10 of the flagellum of the antennæ as broad as they are long, or broader . . . . *L. alieno-brunneus*, [p. 340.

b. Front of the head with a medial, longitudinal delicate carina . . . . *L. alieno-flavus*, p. 341.

c. Front of the head without any medial longitudinal furrow or carina.
- *a'*. Of comparatively large size. Length 4–5·5 mm. Dark castaneous brown to jet-black . . . . *L. fuliginosus*, p. 341.
- *b'*. Smaller. Length 2·5–3·3 mm. Light reddish brown . . . . *L. alienus*, p. 342.

388. **Lasius crinitus**, *Smith* (Formica), *Cat.* vi (1858), p. 13, ♀; *Fore Jour. Bomb. N. H. Soc.* viii (1894), p. 405, ♀.

♀. Ochraceous clay-colour all over, finely and closely reticulate-

punctate; the posterior margin of the pronotum, the scutellum, postscutellum, node of the pedicel above, base and sides of the abdomen and the dorsal surface of the apical four segments covered with remarkably long pale yellow hair, erect, curled and tufted on the pronotum, scutellum and node of the pedicel, and recumbent on the abdomen. Head without the mandibles square, remarkably broad and transverse across the occiput. Thorax narrower than the head, oval, moderately massive, the pronotum vertical, forming no part of the dorsum; the mesonotum large, slightly convex; the metanotum rounded with a moderate slope to the apex. Node of the pedicel laminate, broadly oval; abdomen oval, massive, very convex above.

Length, ♀ 8·5 mm.

Hab. Recorded so far only from Kashmir.

Described from the type (a ♀) in the British Museum. The ☿ and ♂ are unknown, hence this species has not been entered in the key to the species.

389. **Lasius himalayanus**, *Forel.*

Lasius niger, *Linn.*, *race* brunneus, *Latr.*, *var.* himalayanus, *Forel*, *Jour. Bomb. N. H. Soc.* viii (1894), p. 404, ☿.

☿. Dark reddish brown, with an extremely minute silky pubescence giving the insect a shiny glabrous appearance; the mandibles, clypeus, anterior half of the cheeks, antennæ and legs yellowish brown; pilosity almost entirely wanting, represented only by a few scattered, very short, erect pale hairs. Head much wider posteriorly than in front, broad and transverse across the occiput; mandibles stout, subtriangular, pruinose; the masticatory margin minutely dentate, the apical tooth not long or curved; clypeus proportionately large, convex and distinctly medially carinate; antennæ somewhat short, the scape barely extending beyond the top of the head. Thorax short and stout, the basal portion of the metanotum flat, very short, only about one-quarter the length of the obliquely truncate apical portion, which is broad and flat. Node of the pedicel low, slightly convex anteriorly; abdomen very large and massive, strongly convex above.

Length, ☿ 3–3·5 mm.

Hab. N.W. Himalayas, 6000 to 9000 ft.

Dr. Forel considers this and the succeeding species mere varieties of the European *L. brunneus*, Latr.; but *L. himalayanus* seems to me a much more stoutly built insect with a shorter broader metanotum than Latreille's species, while both *L. himalayanus* and *L. alieno-brunneus* can be distinguished from that species at a glance by the longitudinal furrow on the front of the head.

390. **Lasius alieno-brunneus**, *Forel.*

Lasius niger, *Linn.*, *race* brunneus, *Latr.*, *var.* alieno-brunneus, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 404. ☿.

☿. Closely resembles *L. himalayanus*, Forel, but is a distinctly

smaller, paler insect, and very much more densely pubescent; the pubescence longish, very distinct on the head and abdomen. Head without the mandibles nearly square, not much broader posteriorly than in front; mandibles subtriangular, the apical tooth long, curved and acute; clypeus less distinctly carinate, and antennæ proportionately shorter than in *L. himalayanus*. Thorax narrower than in *L. himalayanus*, and the basal portion of the metanotum rounded, not flat above. Node of the pedicel and abdomen as in the above species.

Length, ☿ 2–3 mm.

Hab. N.W. Himalayas, 6000–9000 feet.

It is just possible that this species is the ☿ of *L. crinitus*, Smith.

391. **Lasius alieno-flavus** (*Forel, MS.*), n. sp.

☿. Head, including the mandibles, reddish yellow; antennæ, thorax, legs and abdomen paler dull yellow; head, thorax and abdomen covered with dense fine silky white pubescence, giving the insect a slightly silvery look. Head quadrangular, slightly longer than broad, the cheeks straight, occiput transverse; mandibles subtriangular, the masticatory margin oblique, acutely dentate, the apical tooth long and curved; clypeus proportionately large, convex, very distinctly carinate; antennæ short, the scape not reaching beyond the top of the head, the joints 2–10 of the flagellum as broad as long. Thorax somewhat narrow, basal portion of the metanotum very short, rounded above. Node of the pedicel broader proportionately than in *L. himalayanus*; abdomen not so large or massive.

♀. Much larger, dark brown, pruinose; shape of head, mandibles and antennæ as in the ☿; front of the head between the antennæ delicately longitudinally carinate as in the ☿; clypeus broad, convex, not carinate, transverse anteriorly. Thorax and abdomen large and remarkably massive; node of the pedicel broad, emarginate above. Wings wanting.

Length, ☿ 2·5–3; ♀ 6·5 mm.

Hab. Himalayas, above 8000 feet.

Specimens in Mr. Wroughton's collection have been named as above, I believe, by Dr. Forel, but I do not know of any published description.

392. **Lasius fuliginosus**, *Latr.* (Formica), *Ess. Hist. Fourm. France*, 1798, p. 36, ☿ ♀ ♂.

☿. Dark chestnut-red to black, the mandibles, antennæ and legs yellowish brown. Head, thorax and abdomen very smooth and shining, devoid of pubescence, but with very short and very sparsely scattered erect hairs. Head subtriangular, very convex in front, much broader posteriorly than in front, the occiput slightly but distinctly emarginate; mandibles short, powerful, masticatory margin oblique, minutely dentate; clypeus higher

than broad, convex and medially vertically carinate; antennæ rather short, the scape barely extending beyond the top of the head. Thorax short, stout, convex above, mesonotum slightly

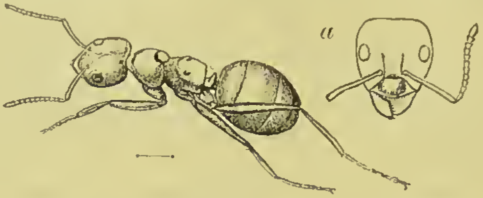

Fig. 102.—*Lasius fuliginosus*, ☿. *a.* Head.

gibbous; metanotum broad posteriorly, its apical face flat. Node of the pedicel subquadrate, broad above, the upper margin gently rounded; abdomen proportionately shorter and less massive.

Length, ☿ 4–5·5 mm.

Hab. Recorded from Thana, in Western India. Occurs also in Europe.

The largest among Indian species.

393. **Lasius alienus**, *Förster* (Formica), *Hym. Stud.* i (1850), p. 36, ☿ ♂; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 404.

☿. Reddish brown to dark brown, antennæ and legs yellowish brown, thorax light clear brown. All Himalayan specimens differ from the European form in being densely pubescent. Head without the mandibles quadrangular, the sides straight, the occiput transverse, as broad as the head in front; mandibles somewhat long, subtriangular, the masticatory margin oblique, dentate; clypeus as high as broad, convex; antennæ rather long, the scape extending beyond the top of the head by about one-quarter of its length. Thorax short and broad as in *L. himalayanus*, the posterior face of the metanotum particularly broad. Node of the pedicel and abdomen as in *L. himalayanus*.

Length, ☿ 2·5–3·3 mm.

Hab. N.W. Himalayas to 9000 ft. Of wide range. occurring in Europe and also in America.

Genus **COLOBOPSIS**.

Formica, pt., *Spinola, Ins. Lig.* ii (1808), p. 244, ☿.
Colobopsis, *Mayr, Eur. Formicid.* 1861, p. 38, ☿ ♀.

Type, *C. truncata*, Spin., from Europe.

Range. Both hemispheres.

☿ *maj.* Characters those of *Camponotus*, with the following differences:—Head more or less cylindrical, anteriorly obliquely and rather sharply truncate from just beyond the base of the clypeus, so that the anterior portion of it is bent downwards at an angle; mandibles linear or subtriangular, with the masticatory margin strongly toothed. Thorax somewhat depressed, cylindrical; legs stout, short, coxæ and femora generally broad and massive.

Node of the pedicel thick, oval, sometimes transverse; abdomen short, broad, oval.

☿ *min.* Similar to the ☿ *maj.* in the shape of the thorax and abdomen, but the anterior portion of the head is only bent down at an obtuse angle, scarcely truncate.

♀. Similar to the ☿ *maj.* in the shape of the head, but the thorax and abdomen are, as usual in all ants, more massive.

The species of *Colobopsis*, though widely diffused in India, Burma, and Ceylon, are nowhere very plentiful. One species, *C. pubescens*, lives in hollows of trees, and the ☿ *min.* on being touched emits an acrid milky juice.

Key to the Species.

A. Colour black, or black and red.
  a. Head, thorax and abdomen entirely black.
    a'. Covered with a thin grey pubescence.... *C. stricta*, p. 343.
    b'. Covered with a dense yellow pubescence. *C. pubescens*, p. 344.
  b. Head ☿ *maj.* black, anteriorly red, of ☿ *min.* entirely black; thorax and abdomen black.
    a'. With a yellow spot on each side of base of abdomen .... *C. cotesi*, p. 345.
    b'. Without a yellow spot, abdomen entirely black .... *C. angustata*, p. 345.
  c. Head, thorax, legs and node of pedicel yellowish brown .... *C. rothneyi*, p. 346.
B. Colour entirely brownish red .... *C. saundersi*, p. 346.
C. Colour entirely testaceous yellow .... *C. testacea*, p. 347.

394. **Colobopsis stricta**, *Jerd.* (Formica), *Madr. Jour. L. & S.* xvii (1851), p. 123, ☿; *Smith* (Formica), *Cat.* vi (1858), p. 16, ☿ ♀; *Forel, Jour. Bomb. N. H. Soc.* vii (1893), p. 438.

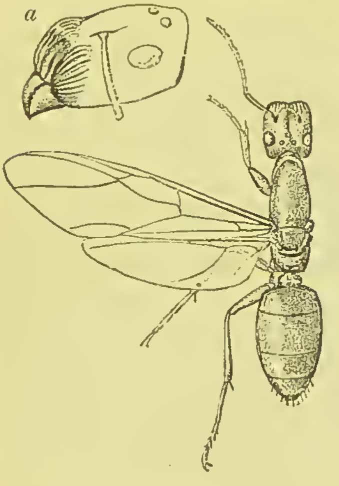

Fig. 103.—*Colobopsis stricta*, ♀. *a.* Head.

☿ *maj.* Black with a few scattered erect brown hairs, and a soft thin greyish pile chiefly visible on the abdomen; antennæ, thorax and legs very dark castaneous brown, almost, but not quite, black. Head very large and massive, a little narrower in front than across the vertex, the anterior truncated portion of the head depressed, the basal portion of the clypeus being thus bent downwards and inwards; the cheeks on either side of the depressed portion acutely ridged and coarsely obliquely striate; the lower portion of the head above truncation longitudinally striate. Thorax narrow, a shallow transverse, rather broad sulcus marking the meso-metanotal suture; basal portion of metanotum rounded above and posteriorly,

apical portion obliquely truncate; legs stout, posterior tibiæ very slightly compressed. Node of pedicel bluntly conical; abdomen narrow, elongate.

Fig. 104. — *Colobopsis stricta*, ☿.

☿ *min.* Similar, smaller; head comparatively broader and not so cylindrical, anteriorly more obtuse than truncate; head and thorax more pubescent.

♀. Similar to the ☿ *maj.*; head not so large or so sharply truncate; truncated portion not so depressed.

Length, ☿ *maj.* 11–12; ☿ *min.* 9–9·5; ♀ 12·5 mm.

Hab. Malabar (*Jerdon*); Burma; extending to Borneo.

It is with some doubt that I have described as *C. stricta* specimens of a *Colobopsis* in the British Museum Collection from India, Burma, and Borneo, labelled as such by the late Mr. F. Smith. Jerdon's original description is quite inadequate for certain identification; he gives the metanotum as bidentate posteriorly ("post-thorax in the form of a rounded narrow platform ending in two points"). None of the specimens in the British Museum labelled *C. stricta* have the metanotum bidentate, otherwise, however, they answer very well to Jerdon's description so far as this goes.

395. **Colobopsis pubescens**, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 691, ♀ ☿; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 435 & 437, ☿.
Colobopsis leonardi, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 515, ☿.

☿ *maj.* Resembles ☿ *maj.* of *C. stricta*, Jerd.: differs in being somewhat smaller, densely pubescent, and in the thorax not being emarginate at the meso-metanotal suture. Black, covered with a thick yellowish rusty pubescence which entirely hides the sculpture. Head very large, cylindrical, comparatively very convex above, the posterior margin of the truncated portion coarsely longitudinally striate, the surface of the truncation wrinkled and with a medial vertical carina on the clypeus. Thorax cylindrical, not sloping or emarginate; legs stout, short; femora and tibiæ compressed; abdomen massive.

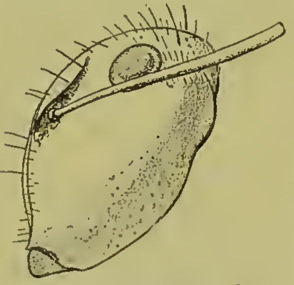
Fig. 105.— *Colobopsis pubescens*. Head of ☿ min.

☿ *min.* Differs only in being slighter and smaller and having the head obtuse anteriorly, scarcely truncate. Forms intermediate between ☿ *min.* and ☿ *maj.* exist.

♀. Resembles the ☿ *maj.* but is not so pubescent, and, as in

all ♀s of the *Formicidæ*, has the thorax and abdomen more massive.

Length, ☿ *maj.* 10–11; ☿ *min.* 6–8; ♀ 13 mm.

Hab. Burma; Tenasserim (*Fea*, *Bingham*).

396. **Colobopsis cotesi**, *Forel, Jour. Bomb. N. H. Soc.* vii (1893), p. 438, ☿ *min.*

☿ *maj.* Black, shining, with very sparse short erect black pubescence; the truncated front of the head, including the base of the clypeus, the scape and flagellum of the antennæ, and the front of the mandibles reddish chestnut, the legs dark brownish chestnut; two spots at the base of the abdomen, a line along the base of the 2nd abdominal segment and two lateral spots at the base of the 3rd segment testaceous yellow. Head very massive anteriorly, above coarsely rugose. Thorax comparatively broad, widely emarginate at the meso-metanotal suture; metanotum raised, rounded, somewhat conical; legs stout, short, femora and tibiæ especially of the anterior legs broad, strongly compressed. Node of pedicel transverse, notched above; abdomen massive, broadly oval.

Fig. 106.
Colobopsis cotesi.
Head ☿ maj.

☿ *min.* Similar, smaller and slighter; head obtuse anteriorly; metanotum truncate posteriorly. Node of pedicel longer than broad, very convex in front, flat posteriorly.

Length, ☿ *maj.* 8; ☿ *min.* 4·5–6 mm.

Hab. The Gáro Hills, Assam (*Long*).

397. **Colobopsis angustata**, *Mayr, Verh. zool.-bot. Ges. Wien*, xx (1870), p. 942, ♀; *Forel, Jour. Bomb. N. H. Soc.* vii (1893), pp. 435 & 436, ♀ ☿.

♀. Black, smooth and shining; the anterior portion of the head, the pro- and mesothorax, the anterior portion of the scutellum, and the legs reddish brown. Head shorter proportionately and the front truncated portion more obtuse than in the ♀ of any other Indian species known to me; mandibles broad, subtriangular; clypeus rectangular, the base beginning just at the margin of the truncation; a medial longitudinally impressed line on the front carried on to the base of the clypeus. Thorax with the pronotum depressed, the mesonotum elongate; scutellum triangular, compressed, and metanotum rounded posteriorly; legs short, robust. Node of the pedicel transverse; abdomen oval, elongate and massive.

" ☿ *maj.* The part of the clypeus situated in the truncated portion is strongly constricted from back to front, and is raised above the sides of the clypeus; no medial carina. Thorax of the ☿ *min.* and of the ☿ (♃) *maj.* with a deep meso-metathoracic

suture. The truncation of the clypeus slight, not submargined." (*Forel.*)

Length, ♀ 10 mm.

Hab. Bengal, Barrackpore (*Rothney*), probably extending through Assam, Burma and Tenasserim to the Malay peninsula and islands. From Singapore var. *siggii*, Forel, has been described. Of *C. angustata* I have only seen the ♀. The ☿ *maj.* and ☿ *min.* are unknown to me.

398. **Colobopsis rothneyi**, *Forel, Jour. Bomb. N. H. Soc.* vii (1893), p. 435, ☿.

☿ *maj.* Short, broad, with the head comparatively very massive and large. Head and thorax testaceous brown; abdomen black, shining, the posterior margins of the segments yellowish white. Head cylindrical, the truncated portion concave; clypeus medially vertically carinate, the front behind the margin of the truncation coarsely reticulate-punctate. Thorax broad, comparatively broader than in the other Indian species; pro-meso- and meso-metanotal sutures distinct, the thorax not emarginate at the latter. Node of pedicel transverse; abdomen massive.

♀. Larger relatively to the ☿ *maj.* than in other Indian species; head more elongate than in the ☿ *maj.*; metanotum more convex.

☿ *min.* Unknown to me.

Length, ☿ *maj.* 4; ♀ 7 mm.

Hab. Bengal, Orissa (*Taylor*), Barrackpore (*Rothney*).

This species closely resembles *C. truncata*, Spinola, of Europe. The type is in Mr. Rothney's collection.

399. **Colobopsis saundersi**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 516, ☿; *Forel, Jour. Bomb. N. H. Soc.* vii (1893), pp. 435 & 438, ☿ ♀.

☿ *min.* Red, the legs and a subapical transverse line on the margins of the abdominal segments fuscous; pubescence very short and sparse, mixed with a few erect pale hairs on the front of the head and at the apex of the abdomen. Head anteriorly subtruncate; mandibles rather narrow, clypeus with a distinct but not prominent medial vertical carina; antennal carinæ short, wide apart. Thorax viewed from the side with a shallow wide sulcation in the middle, obliquely truncate posteriorly; legs of moderate length, fairly densely clothed with short oblique whitish hairs. Node of pedicel low, conical, convex anteriorly, somewhat flat posteriorly; abdomen oval, about as long as the thorax.

Fig. 107.
Colobopsis saundersi, ☿ min. Head and thorax.

" ☿ *maj.* The head is greatly enlarged in front, strongly truncated and with a very acute margin, which is also the case with

the ♀, just as it is with the ☿ and ♀ of *C. pubescens*, but in the latter species the margin of the truncated portion is less raised and more obtuse." (*Forel.*)

Length, ☿ 5–6 mm.

Hab. Lower Burma, Pegu Yoma (*Allan*); Tenasserim (*Fea*); Sumatra.

☿ *maj.* and ♀ are unknown to me.

400. **Colobopsis testacea**, n. sp.

♀. Pale testaceous yellow, with only a few scattered erect pale yellow hairs. Head cylindrical, the anterior truncated portion deeply depressed and very closely set with shallow punctures; clypeus medially vertically carinate, the portion of the cheeks forming the lateral rims of the depressed truncation carinate along the edge; head wider anteriorly than at the occiput, this latter rounded posteriorly. Thorax as in *C. stricta* ♀; legs short, the femora and tibiæ compressed, anterior femora remarkably broad. Node of pedicel thick, transverse above; abdomen elongate, massive.

Length, ♀ 7; *exp.* about 13 mm.

Hab. Ceylon (*Thwaites*: Hope Mus. Oxford, type).

☿ *maj.* and ☿ *min.* unknown.

Genus CAMPONOTUS.

Formica, pt., *Linn. Syst. Nat.* ed. 12, i (1766), p. 962; *Smith, Cat.* vi (1858), p. 1.
Camponotus, *Mayr, Eur. Form.* 1861, p. 35.

Type, *C. ligniperdus*, Latr., from Europe.

Range. Both hemispheres.

☿. Mandibles triangular or subtriangular, with broad toothed masticatory margins; maxillary palpi 6-, labial palpi 4-jointed; clypeus trapeziform, not extending to the outer border of the cheeks; antennal carinæ sinuate, somewhat S-shaped, rising from the posterior border of the clypeus; antennal and clypeal hollows separate; antennæ 12-jointed, filiform, originating remote from the posterior border of the clypeus; frontal area small, broader than long; eyes moderately large, placed above the middle line of the head; ocelli absent.

Thorax anteriorly broad, posteriorly more or less compressed; pro-meso- and meso-metanotal sutures generally distinct. The form of the thorax varies much among Indian species of this genus, but four fairly distinct types occur: (*a*) pro-, meso- and metanotum forming a regular arch; (*b*) pro-, meso- and metanotum forming an arch, but the last more or less truncate at apex; (*c*) pro- and mesonotum arched, metanotum gibbous, raised out of the line of the curve; (*d*) pro- and mesonotum arched, meso-metanotal suture emarginate, metanotum very strongly laterally compressed, the sides vertical, the basal portion above

horizontal, the apex sharply truncate and more or less concave. Pedicel 1-jointed, surmounted by a scale or node; abdomen more or less oval, the basal segment not forming half its length.

♀. Head and pedicel as in the ☿. Ocelli present. Thorax more massive; prothorax short, its posterior margin arched; posterior lateral angles reaching back to the base of the wings; mesonotum and scutellum long, raised and gibbous; metanotum depressed below the level of the scutellum. Abdomen longer and more massive. Fore wing with one marginal and one cubital cell.

♂. Mandibles narrower than in the ☿; antennæ 13-jointed; ocelli and eyes large and prominent. Thorax as in the ♀, but more massive in proportion. Node of pedicel thicker; abdomen proportionately slightly more elongate; external genitalia very small.

This widely spread genus has the ☿ dimorphous, often polymorphous. In some species the ☿ major has a remarkably broad massive head and strong mandibles.

Fig. 108.—Outline thorax: *C. compressus.*

Key to the Species.

A. Thorax viewed from side forming a regular arch.
- *a*. Pubescence on sides of head and beneath long, forming a beard ...... *C. barbatus*, p. 362.
- *b*. Pubescence on sides of head and beneath short, not forming a beard.
  - *a'*. Head, thorax and abdomen black.
    - a^2. Tibiæ of the legs prismatic.
      - a^3. Tibiæ without spines beneath .. *C. lamarcki*, p. 365.
      - b^3. Tibiæ of the legs with spines beneath.
        - a^4. Abdomen covered with long recumbent yellowish hair .. *C. japonicus*, p. 370.
        - b^4. Abdomen covered with sparse erect hairs.
          - a^5. ☿ *maj.* Length 11–16 mm. ☿ *min.* with head posteriorly narrow but not constricted to form a collar .. *C. compressus*, p. 351.
          - b^5. ☿ *maj.* Length 17–21 mm. ☿ *min.* with the head posteriorly constricted so as to form a collar .... *C. angusticollis*, p. 366.
    - b^2. Tibiæ of the legs compressed but not prismatic.
      - a^3. Abdomen with a fine thin sericeous pubescence.
        - a^4. Length ☿ *maj.* under 7 mm.; pubescence grey .... *C. binghami*, p. 367.
        - b^4. Length ☿ *maj.* over 9 mm.; pubescence yellowish ...... *C. paria*, p. 364.

b^3. Abdomen more or less opaque, without any fine sericeous pubescence.

a^4. Hind tibiæ spinose beneath .. *C. dolendus*, p. 364.

b^4. Hind tibiæ without spines beneath .... *C. crassisquamis*, p. 368.

b'. Head, thorax and abdomen entirely pale yellow .... *C. invidus*, p. 367.

c'. Head, thorax and abdomen never all black or all yellow.

a^2. Scape of antennæ flat.

a^3. Basal joint of tarsi broad and flat .... *C. mistura*, p. 360.

b^3. Basal joint of tarsi narrow, slightly depressed .... *C. fornaronis*, p. 360.

b^2. Scape of antennæ cylindrical.

a^3. Abdomen with dense silky pubescence.

a^4. Clypeus with a distinct medial lobe produced anteriorly .... *C. rufoglaucus*, p. 363.

b^4. Clypeus without a medial lobe, its anterior margin transverse. *C. mendax*, p. 370.

b^3. Abdomen without, or with only very thin, sparse recumbent pubescence.

a^4. Tibiæ cylindrical.

a^5. Tibiæ covered with long erect hairs .... *C. buddhæ*, p. 359.

b^5. Tibiæ covered with very widely spaced, adpressed hairs.

a^6. With a few spines on apical third of tibiæ beneath .... *C. oblongus*, p. 358.

b^6. Without spines on tibiæ.

a^7. Medial lobe of clypeus with its anterior margin rounded .... *C. wroughtoni*, p. 372.

b^7. Medial lobe of clypeus with its anterior margin transverse.

a^8. ☿ *maj.* under 8, ☿ *min.* under 6 mm. ...... *C. taylori*, p. 353.

b^8. ☿ *maj.* over 8, ☿ *min.* over 6 mm.

a^9. ☿ *maj.* with 7, ☿ *min.* with 6 teeth. *C. infuscus*, p. 354.

b^9. ☿ *maj.* with 6, ☿ *min.* with 5 teeth. *C. variegatus*, p. 359.

b^4. Tibiæ compressed.

a^5. Tibiæ spined beneath.

a^6. Head, thorax and abdomen castaneous red.

a^7. ☿ *maj.* over 15, ☿ *min.* over 10 mm. .... *C. festinus*, p. 362.

b^7. ☿ *maj.* not over 8, ☿ *min.* 5–6 mm. .... *C. arrogans*, p. 357.

b^6. Head and abdomen black or dark castaneous red; thorax yellow, wholly or in part.
  a^7. Medial lobe of clypeus long rectangular; the lateral angles acute.
    a^8. Head much broader posteriorly than in front.. *C. dichrous*, p. 356.
    b^8. Head only as broad posteriorly as in front .. *C. basalis*, p. 352.
  b^7. Medial lobe of clypeus short, not much produced; the lateral angles rounded ...... *C. irritans*, p. 353.

b^5. Tibiæ without spines beneath.
  a^6. Head, thorax and abdomen finely rugulose opaque.
    a^7. Castaneous brown .... *C. badius*, p. 358.
    b^7. Reddish yellow, apex of abdomen darker ...... *C. nicobarensis*, p. 364.
  b^6. Head, thorax and abdomen sparsely punctured, shining, not opaque.
    a^7. Head, thorax and abdomen dark castaneous brown.
      a^8. Pronotum longer than mesonotum, strongly constricted, anteriorly forming a neck ...... *C. carin*, p. 365.
      b^8. Pronotum about equal in length to mesonotum, only slightly constricted, in front not forming a distinct neck .... *C. thraso*, p. 356.
    b^7. Head and abdomen fuscous brown or black (in ☿ *min.* head sometimes yellow); thorax honey-yellow.
      a^8. Distance between the antennal carinæ equal to distance between eyes and antennal carinæ .... *C. mitis*, p. 355.
      b^8. Distance between antennal carinæ distinctly greater than between eyes and antennal carinæ .... *C. pallidus*, p. 357.

B. Regular arch of the thorax interrupted by the apex of the metanotum being truncate.
  a. Mandibles toothed at apex and also on inner margin .... *C. gigas*, p. 369.

b. Mandibles toothed only at apex.
  a'. Clypeus anteriorly emarginate in the middle .... *C. marginatus*, p. 369.
  b'. Clypeus not emarginate.
    a². Scape of antennæ flattened........ *C. radiatus*, p. 371.
    b². Scape of antennæ cylindrical.
      a³. Length ☿ *maj.* over 12, ☿ *min.* over 5 mm.................... *C. siemsseni*, p. 361.
      b³. Length ☿ *maj.* under 7, ☿ *min.* under 5 mm.
        a⁴. Head, thorax and abdomen reddish brown.............. *C. reticulatus*, p. 372.
        b⁴. Head and thorax black, abdomen castaneous .... *C. yerburyi*, p. 372.

C. Regular arch of the thorax interrupted by the metanotum being raised, rounded above and gibbous.
  a. Anterior lateral angles of pronotum dentate or subdentate.
    a'. Abdomen with dense, recumbent, sericeous golden pile hiding the sculpture .... *C. auriventris*, p. 374.
    b'. Abdomen without recumbent pile, the sculpture plainly visible .... *C. wasmanni*, p. 375.
  b. Anterior lateral angles of pronotum rounded, not dentate.
    a'. Length over 9 mm.
      a². Thorax posteriorly and node of pedicel coarsely punctured, cribrate. *C. holosericeus*, p. 374.
      b². Thorax posteriorly and node of pedicel finely reticulate-punctate, rugulose .... *C. camelinus*, p. 373.
    b'. Length under 9 mm. .... *C. confucii*, p. 375.

D. Regular arch of the thorax interrupted at the meso-metanotal suture by the metanotum forming an angle with the mesonotum; basal portion of metanotum horizontal, flat or slightly concave; apical portion excavate.
  a. Tibiæ of legs spinous beneath.
    a'. Length 6–10 mm.; node of pedicel thick, globose .... *C. sericeus*, p. 376.
    b'. Length 3–4 mm.; node of pedicel broader than long, somewhat flat .. *C. varians*, p. 377.
  b. Tibiæ of legs not spinous beneath ...... *C. nirvanæ**, p. 377.

401. **Camponotus compressus**, *Fabr.* (Formica), *Mant. Ins.* i (1787), p. 307, ☿; *Smith* (Formica), *Cat.* vi (1858), p. 13, ♀ ♂.
Camponotus maculatus, *Fabr.*, *race* compressus (*Fabr.*), *Forel*, *Jour. Bomb. N. H. Soc.* vii (1892), pp. 229 & 240.

☿ *maj.* Black, opaque, very finely and densely reticulate-

* *C. luteus* and *C. gretæ*, p. 379, are omitted from this key, the workers being unknown.

punctate, the pedicel and base of abdomen sometimes shining, the posterior margins of the abdominal segments narrowly testaceous, mandibles, flagellum of the antennæ and legs castaneous brown or red, rarely black; pubescence sparse, erect, often wanting on the head and thorax. Head triangular, very

Fig. 109.—*Camponotus compressus*, ☿ maj. *a*. Head.

broad posteriorly, lateral occipital angles prominent; mandibles with 7 teeth; clypeus medially vertically carinate, the middle portion anteriorly rectangularly produced into a lobe; scape of antennæ cylindrical; eyes comparatively small, frontal rather than lateral. Thorax narrower than the head, anteriorly produced into a collar; legs long, tibiæ compressed prism-shaped. Node of pedicel oval, transverse, convex in front, flat posteriorly; abdomen comparatively broad and massive.

☿ *min.* Similar, smaller and more slender; head elongate, produced and narrowed posteriorly, the sides of the head straight not convex; mandibles with 5 teeth.

♀. Resembles the ☿ *maj.*, but the head is not so large in proportion, and its lateral occipital angles not so prominent; mesonotum gibbous in front, flat or very lightly convex above.

♂. Somewhat similar to the ♀; head very small, subtriangular, mesonotum and scutellum gibbous; node of the pedicel bituberculate above.

Length, ☿ *maj.* 11–16; ☿ *min.* 6–8; ♀ 14–18; ♂ 10–13 mm.

Hab. India, Assam, Burma, Ceylon, ascending up to 7000 ft., perhaps higher; extending through Russia and Arabia into Africa, and on the east to the Malayan subregion.

This species is plentiful where it occurs, but in Burma certainly it is locally distributed. Interesting accounts of its habits are given by Mr. Rothney (Trans. Ent. Soc. Lond. 1889, pp. 347–350) and by Mr. Wroughton (Jour. Bomb. N. H. Soc. vii (1892), p. 30). It is one of the ants noted for tending and keeping "ant-cattle."

402. **Camponotus basalis**, *Smith, 2nd Yark. Miss., Hym.* 1878, p. 9, pl. fig. 1, ♀.

Camponotus maculatus, *Fabr.*, *race* lobinieri, *Forel, Ann. Soc. Ent. Belge,* xlvi (1902), p. 287.

☿ *maj.* Head and abdomen fuscous brown or black, antennæ, thorax, legs and node of pedicel reddish yellow; abdomen in front with a large reddish-yellow stain, the posterior margins of the

abdominal segments yellowish. Head, thorax and abdomen finely, very closely rugulose, subopaque. Head without the mandibles seen from the front long, narrow, somewhat rectangular, but with the angles rounded, as broad posteriorly as in front; mandibles broadly triangular, armed with 6–7 teeth; clypeus broadly produced in the middle into a lobe, convex in the middle, concave at the sides, and with a distinct medial carina; antennal carinæ long and divergent posteriorly, antennæ long, the scape passing the top of the head by about one-third of its length. Thorax long and narrow in profile, forming a single curve above; legs long, slender, the pubescence on the tibiæ close and recumbent. Node of pedicel as in *C. mitis*; abdomen long and narrowly oval.

☿ *min.* Closely resembles the ☿ *maj.*, with similar coloration, pilosity, and sculpture, but the head is proportionately smaller, the antennæ more slender and longer, the scape extending by about half its length beyond the top of the head, while the thorax is narrower and not so strongly arched.

Length, ☿ *maj.* 8; ☿ *min.* 6·5; ♀ 11 mm.

Hab. Recorded so far only from Kashmir (*2nd Yark. Miss. Coll. & Lobiniere*).

403. **Camponotus irritans**, *Smith* (Formica), *Proc. Linn. Soc.* ii (1857), p. 55, ☿; *id. Cat.* vi (1858), p. 25, ☿.

Camponotus agnatus, *Roger*, *Berlin. ent. Zeit.* vii (1863), p. 137, ☿.

Camponotus maculatus, *Fabr.*, *race* irritans (*Smith*), *Forel*, *Jour. Bomb. N. H. Soc.* vii (1892), pp. 230 & 242, ☿.

☿ *maj.* Head and abdomen shining, dark castaneous brown flagellum of the antennæ, thorax, pedicel and legs honey-yellow; the front and vertex of the head, but not the cheeks, the thorax, node of pedicel and abdomen above, with sparse erect pubescence, head, thorax and abdomen extremely lightly and finely reticulate-punctate but not opaque. Head subtriangular, very convex in front; mandibles with 7 teeth; clypeus tectiform, raised along the medial carina; median lobe extremely short; antennæ and eyes as in *C. compressus*. Thorax proportionately longer, narrower, more compressed in front: legs covered with a fine, short, oblique pubescence, tibiæ slightly compressed. Node of pedicel narrow, conical, convex in front, flat posteriorly; abdomen shorter and distinctly narrower than the head.

☿ *min.* Similar, slighter, the head concolorous with the thorax, oval, rounded posteriorly, and only a little wider than the thorax.

Length, ☿ *maj.* 8–10; ☿ *min.* 6–7 mm.

Hab. India, Ceylon (*Yerbury*, *Green*); Malay Peninsula (*Forel*); Bankok (*Sigg*). I procured *C. irritans* only at Mergui, in the south of Tenasserim.

404. **Camponotus taylori.**

Camponotus maculatus, *Fabr.*, *race* taylori, *Forel*, *Jour. Bomb. N. H. Soc.* vii (1892), pp. 229 & 241, ☿.

☿ *maj.* Castaneous brown, the mandibles, antennæ, thorax and

legs of a lighter redder brown, minutely and closely reticulate-punctate, the head and the thorax above with scattered larger punctures; pubescence sparse, short, erect, a little more plentiful on the front of the head, the cheeks and the abdomen. Head subtriangular; mandibles with 7 teeth; clypeus, antennæ and

Fig. 110.—*Camponotus taylori*, ☿ maj.

eyes as in *C. compressus*, but the median lobe of the clypeus is very shortly produced. Thorax very broad and short, the prothorax nearly as broad as the head; legs comparatively short and stout, covered with a short, not very dense recumbent pubescence: tibiæ cylindrical. Node of the pedicel as in *C. compressus*, but not so broad; abdomen short and broad.

Fig. 111.—*Camponotus taylori*, ☿ min.

☿ *min*. Similar, more slender, head comparatively longer, narrower, almost rectangular, broadly rounded posteriorly. Node of pedicel conical; abdomen narrow.

Length, ☿ *maj*. 7–8; ☿ *min*. 5–5·5 mm.

Hab. Distributed throughout India, but local. Recorded from the N.W. Himalayas (*Smythies*); Sikhim (*Möller*); Orissa (*Taylor*); Poona; the Nilgiris (*Wroughton*); Ceylon (*Yerbury*); Burma (*Allan*); the Shan States (*Craddock*). The Ceylon form, slightly darker, with longer legs, and the tarsi and flagellum yellowish, has been separated by Forel as var. *infuscoides*. Var. *albosparsus*, Forel, is redder in colour, with lateral yellow spots (somewhat confluent) on the basal two abdominal segments. I found this a common form in the Shan States, and observed a colony once attending a number of larval Hemiptera.

405. **Camponotus infuscus**, *Forel*.

Camponotus maculatus, *Fabr.*, *race* infuscus, *Forel*, *Jour. Bomb. N. H. Soc.* vii (1892), pp. 230 & 242, ☿.

☿ *maj*. Resembles *C. taylori*, but is a larger, more stoutly-built and darker insect. Very dark castaneous brown, almost black; mandibles, clypeus, flagellum of the antennæ and legs lighter

brown. Head triangular, lateral occipital angles prominent; mandibles and clypeus as in *C. taylori*, but the median lobe of the latter considerably longer. Thorax broad; pronotum nearly as broad as long; legs comparatively short, covered with short, rather sparse recumbent hairs. Node of the pedicel narrowly oval; abdomen broad and massive.

☿ *min.* Similar, slighter; head somewhat rectangular, rounded above, about the same width as the prothorax; mandibles with 6 teeth; antennæ, thorax, legs and abdomen all comparatively longer than in the ☿ *maj.*

Length, ☿ *maj.* 8–9; ☿ *min.* 6–7 mm.

Hab. Ceylon (*Yerbury*); Upper Burma, Maymyo, 3000 ft. (*Smythies*).

406. **Camponotus mitis**, *Smith* (Formica), *Cat.* vi (1858), p. 20, ☿.

Formica ventralis ♀ & bacchus ☿, *Smith, Cat.* vi (1858), pp. 20 & 21.

Camponotus maculatus, *Fabr.*, *race* mitis (*Smith*), *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 230 & 242, ☿.

☿ *maj.* Head, scape of antennæ and abdomen opaque dark fuscous brown; flagellum of the antennæ, thorax and legs yellowish brown; pubescence erect, sparse on the head and thorax, more plentiful on the abdomen, short, fairly close, and recumbent on the legs. Head subtriangular, broad posteriorly, the occiput

Fig. 112.—*Camponotus mitis*, ☿ maj.

emarginate; mandibles, clypeus, antennæ and eyes as in *C. compressus.* Thorax stout; legs moderately long, femora slightly compressed, tibiæ prism-shaped, longitudinally channeled. Node of the pedicel a little narrower than in *C. compressus*; abdomen comparatively broad, long and massive.

☿ *min.* Similar, but of a testaceous brown all over; head rectangular, narrow, posteriorly rounded.

Fig. 113.—*Camponotus mitis*, ☿ min.

♀. Resembles the ☿ *maj.*, but the sides of the head are more convex, the lateral occipital angles rounded, the occiput transverse. Node of the pedicel broader, flatter, rounder above; abdomen very large and massive.

Length, ☿ *maj.* 8–10; ☿ *min.* 6–7·5; ♀ 11–13 mm.

Hab. A very variable species, spread in one form or other throughout our limits, and extending through the Indo-Malayan region to New Guinea.

Var. *bacchus*, Smith, is reddish, with the head and abdomen more or less fuscous.

Var. *fuscithorax*, Forel (*loc. cit.*), is very dark brown, with the coxæ and base of the femora yellow.

Var. *comottoi*, Emery (Ann. Mus. Civ. Gen. xxiv (1887), p. 513, ☿ & ♀), and var. *dulcis*, Emery (*loc. cit.* xxvii (1889), p. 571, ☿), are pale varieties found in Burma; and lastly, var. *crassinodis*, Forel (*loc. cit.*), which is not uncommon in Burma and Tenasserim, is of a very dark chestnut-brown colour, shining, with longer and somewhat denser erect pilosity, and the node of the pedicel thick and conical.

407. **Camponotus dichrous**, *Forel.*

Camponotus maculatus, *Fabr.*, *race* dichrous, *Forel, Bull. Soc. Vaud. Sc. Nat.* xvi (1879), p. 65; *id. Jour. Bomb. N. H. Soc.* vii (1892), p. 432.

☿ *maj.* Head and 3rd and following segments of the abdomen pitch-black; flagellum of the antennæ, thorax, legs and basal two segments of the abdomen yellow, the latter with sometimes brown markings; the thorax anteriorly shaded with brown. Head triangular, the lateral occipital angles very prominent; mandibles with 7 teeth; clypeus carinate, with a median anteriorly produced rectangular lobe, as in *C. compressus*. Thorax anteriorly narrowed into a collar; legs long and rather slight, tibiæ compressed and feebly longitudinally carinate. Node of the pedicel not so thick as in *C. compressus*; abdomen oval, not broader than the head.

☿ *min.* Similar, much smaller and more slender, the head narrower posteriorly than in front, the occiput compressed.

Length, ☿ *maj.* 9–11; ☿ *min.* 5–6·5 mm.

Hab. The Himalayas to 6000 ft. (*Wood-Mason, Sage & Möller*).

Forel has described a lighter-coloured and slightly larger variety as var. *kattensis*. The species resembles *C. variegatus*, Smith, but is structurally different.

408. **Camponotus thraso**, *Forel.*

Camponotus maculatus, *race* thraso, *Forel. Jour. Bomb. N. H. Soc.* vii (1893), p. 432, ☿.

☿ *maj.* Very dark castaneous, almost black, very minutely reticulate-punctate, shining; pubescence almost absent (or abraded), reduced to very scanty scattered erect hairs. Head rectangular, as broad posteriorly as in front: clypeus carinate, with a very short lobe, its anterior margin transverse: mandibles moderately broad, the teeth abraded or obsolete; antennal carinæ short, moderately close together, divergent posteriorly. Thorax somewhat depressed in front, strongly compressed posteriorly: pro-

mesonotal suture very distinct, meso-metanotal indistinct; legs short; tibiæ compressed but not prismatic, and destitute of spines beneath. Node of pedicel biconvex, as long as broad; abdomen moderately massive.

☿ *min.* Closely resembles the ☿ *maj.*, but is slightly lighter in colour, with the legs markedly lighter; node of the pedicel convex in front, flat posteriorly.

Length, ☿ *maj.* 6·5–8; ☿ *min.* 4–6 mm.

Hab. Ceylon (*Yerbury*); Burma, Maymyo, 3000 ft. (*Bingham*); Taunggyi, Southern Shan States (*Thompson*).

I am not quite certain whether I have identified this species correctly. I found a few attending some Aphides on a jungle-plant at Maymyo and again at Taunggyi.

409. **Camponotus arrogans**, *Smith* (Formica), *Cat.* vi (1858), p. 23, ☿.
Camponotus maculatus, *Fabr.*, *race* junctus, *Forel*, *Jour. Bomb. N. H. Soc.* vii (1892), pp. 231 & 243, ☿.

☿ *maj.* Head, node of the pedicel and abdomen very dark brown or black; flagellum of the antennæ, thorax and legs brownish red; head and thorax very finely reticulate-punctate, subopaque; abdomen shining, posterior margins of segments testaceous. Head proportionately very large and massive, 2·5 mm. wide at occiput and strikingly wider than the thorax; mandibles with 7 teeth; clypeus medially vertically carinate, median lobe as in *C. irritans*, very short. Thorax short and narrow; prothorax rounded in front, about as broad as long; legs short and stout, tibiæ cylindrical. Node of pedicel very broadly oval, not very convex anteriorly; abdomen short and somewhat narrow.

☿ *min.* Smaller and more slender, similar in sculpture and colour; head oblong oval, narrowed at the occiput. Node of pedicel proportionately narrower, subacuminate; abdomen proportionately longer and more massive.

Length, ☿ *maj.* 8–9; ☿ *min.* 5–6·5 mm.

Hab. Bengal (*Rothney*); Burma; Tenasserim (*Bingham*); the Malay Peninsula (*Brit. Mus.*).

A forest ant. I have compared specimens of *C. maculatus*, Fabr., race *junctus*, Forel, in Mr. Rothney's collection, identified and named by Dr. Forel, with the types of *C. arrogans*, Smith, in the British Museum. The two are identical.

410. **Camponotus pallidus**, *Smith* (Formica), *Proc. Linn. Soc.* ii (1857), p. 57, ☿; *id. Cat.* vi (1858), p. 26, ☿; *Forel*, *Jour. Bomb. N. H. Soc.* vii (1892), pp. 228 & 239, ☿ (*var.* subnudus, *Emery*).
Camponotus rubripes, *Drury*, *race* subnudus, *Emery*, *Ann. Mus. Civ. Gen.* xxvii (1889), p. 511, ☿.

☿ *maj.* Mandibles, scape of the antennæ and head dark brownish red, thorax, legs and node of the pedicel testaceous yellow; abdomen black; pubescence sparse, erect, yellowish, only the legs thickly set with erect yellow hairs. Head widely tri-

angular, occiput deeply emarginate; mandibles with 6 teeth; clypeus subcarinate, median lobe rectangularly produced. Thorax elongate; legs stout, tibiæ subcylindrical. Node of pedicel slightly convex in front, flat posteriorly, acuminate at apex; abdomen oval, somewhat large and massive proportionately.

☿ *min.* Similar, more slender; head rectangular, the sides parallel, the occiput rounded and narrowed. Thorax more elongate proportionately. Node of pedicel oval.

Length, ☿ *maj.* 8–9; ☿ *min.* 5–6 mm.

Hab. Burma (*Allan*); Tenasserim (*Bingham*); the Malay Peninsula and islands down to Borneo (*Wallace*).

Described from the type in the British Museum. Except that Burmese specimens are slightly larger and darker, there is no difference, so far as I can see, between Smith's species and the race or variety *subnudus*, Emery.

411. **Camponotus badius**, *Smith* (Formica), *Proc. Linn. Soc.* ii (1857), p. 54; *id. Cat.* vi (1858), p. 22.

☿ *maj.* Head and abdomen black, mandibles, flagellum of the antennæ, thorax and legs reddish brown, shaded with fuscous on the thorax above and on the tibiæ of the legs. Head and thorax subopaque; abdomen smooth, shining. Pubescence sparse, erect. Head a little longer than broad, the sides convex, the occiput very slightly emarginate; mandibles with 7 teeth; clypeus broad, tectiform, with a broad median lobe rectangularly produced, its anterior margin denticulate. Thorax short and massive; legs short, the tibiæ compressed and longitudinally channeled. Node of pedicel thick, oval, convex anteriorly, flat posteriorly; abdomen comparatively broad and massive.

☿ *min.* Similar, more slender; head similar to that of the ☿ *maj.*, not compressed or rounded posteriorly; mandibles with 6 teeth; clypeus distinctly vertically carinate. Node of pedicel narrower.

Length, ☿ *maj.* 7–8; ☿ *min.* 5–6·5 mm.

Hab. Burma (*Bingham*); Ceylon; Malacca; Borneo (*Brit. Mus.*).

Some specimens of the ☿ *min.* are entirely dark castaneous brown and subopaque all over.

412. **Camponotus oblongus**, *Smith* (Formica), *Cat.* vi (1858), p. 21, ☿; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), p. 227, ☿.

☿ *maj.* Very dark brown, almost black, with a tint of reddish on the prothorax in some specimens; antennæ and legs light reddish yellow; posterior margins of the abdominal segments testaceous; pubescence almost wanting, consisting of only a few scattered erect hairs. Head large, massive, as broad anteriorly as across the occiput, this latter emarginate, the lateral angles rounded but prominent; mandibles with 7 teeth; clypeus broad, subtectiform but not carinate; median lobe short, anteriorly

transverse. Thorax short, broad and robust; legs stout, tibiæ cylindrical. Node of pedicel thick, convex in front, flat posteriorly; abdomen broad and massive.

☿ *min.* Similar; much smaller, slighter, and lighter in colour. Head not narrowed posteriorly; clypeus more distinctly tectiform; mandibles with 6 teeth.

Length, ☿ *maj.* 8–9; ☿ *min.* 5·5–6 mm.

Hab. India, Bhutan (*Calcutta Mus.*); Sikhim (*Möller*); Assam (*Smythies*); Burma; Siam (*Bingham*).

413. **Camponotus variegatus**, *Smith* (Formica), *Cat.* vi (1858), p. 19, ☿ ♀.

☿ *maj.* Yellowish red without lustre, head and abdomen fuscous, flagellum of the antennæ and legs paler than thorax; pubescence pale yellow, sparse and erect. Head subtriangular, rather elongate, the posterior lateral angles not prominent; mandibles with 6 teeth; clypeus tectiform, median lobe very short. Thorax narrow, rather compressed; legs long, comparatively fine and delicate, tibiæ cylindrical. Node of the pedicel small, remarkably thick, very convex in front, flat posteriorly; abdomen broadly oval.

☿ *min.* Similar, smaller and more slender, head and abdomen only a shade darker than the thorax; mandibles with 5 teeth.

♀. Testaceous yellow all over, mandibles red-brown, scape of the antennæ fuscous; abdomen with the apical margins of the segments dark brown, giving it a cross-barred appearance. Head, thorax and abdomen finely and densely reticulate-punctate.

Length, ☿ *maj.* 9–10; ♀ *min.* 6–7; ♀ 13 mm.

Hab. Ceylon (*apud Smith*); Upper Burma, Ruby Mines District (*Bingham*); the Shan States (*Thompson*); Maymyo, 3000 ft. (*Smythies*); Singapore (*apud Smith*).

414. **Camponotus buddhæ**, *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 227 & 238, ☿.

"☿ *media.* Head rectangular, with the posterior margin transverse and the posterior angles rounded; length of scape 1·9 mm., of posterior tibia 2 mm. Mandibles armed with 6 teeth more or less worn (obtuse), very finely reticulate-striate, somewhat shining, profusely punctured, moderately curved on the external margin. Clypeus carinate, with a trapeziform anterior lobe, the margin in front shorter than the margin at base, and furnished with stiff hairs. Frontal area rather wide. Antennal carinæ divergent.

"Thorax moderately arched, wide in front, compressed posteriorly. The sloping face of the metanotum not distinct, about as long as half the basal portion. Node of pedicel narrow, oval, biconvex, thick, with an obtuse margin, which is narrow at the summit. Tibiæ nearly cylindrical (a little compressed) without spines.

"Shining, very finely and feebly rugulose. A superimposed coarse punctation is spread all over the head, somewhat more abundant posteriorly than in front. On the thorax and abdomen

the punctures are smaller, more sparse, and often a little raised and bearing hairs.

"The whole body, the legs and the scape thickly covered with erect hairs, acute and yellowish, of very irregular length and thickness; the long hairs are mixed with the shorter and finer ones. On the tibiæ and the scape this pilosity is entirely erect and very abundant. Recumbent pubescence very thin.

"Of a testaceous yellow. Head, tarsi and scape a little more reddish yellow. Mandibles reddish. The antennal carinæ, extreme anterior margin of the head, extreme margins of the joints of the segments of the body and of the legs lightly but distinctly brownish. On the abdominal segments this brownish transverse line is subapical.

"*Length*, ☿ *media* 6·5 mm.

"*Hab.* Lahoul, frontier of Tibet." (*Forel.*) Unknown to me.

415. **Camponotus fornaronis**, *Forel.*

Camponotus mistura, *race* fornaronis, *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 224 & 232, ☿ maj.

"☿ *maj.* The only ☿ that I possess differs from typical *C. mistura*, not only by its narrow tarsi (not dilated), but by its more arched thorax and by its much feebler sculpture; the thorax and the posterior angles of the head are somewhat shining and rather feebly reticulate (opaque or subopaque in typical *C. mistura*). The node of the pedicel is thicker and has an obtuse margin (acute in *C. mistura*). *C. mistura* is covered with a distinct though sparse, rather long recumbent pubescence; *C. fornaronis* has only an extremely short fine indistinct yellow pubescence. The pilosity is as in *C. mistura*, but a little scantier, longer, and of a clearer yellow colour. The scape is somewhat wider and more depressed even than in *C. mistura.* Mandibles strongly curved near their apex, armed with 6 teeth. Head without the mandibles 3·75 mm. long, 3·9 mm. wide. Length of scape 3 mm., of the posterior tibiæ 3·2 mm.

'*Length*, ☿ *maj.* 12–13 mm.

"*Hab.* Continental India." (*Forel.*) This species is unknown to me.

416. **Camponotus mistura**, *Smith* (Formica), *Proc. Linn. Soc.* ii (1857), p. 53, ♀; *id. Cat.* vi (1858), p. 24, ♀; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), p. 224, ☿.

☿ *maj.* The lower portion of the head, the scape of the antennæ and the abdomen black, the occiput, vertex and sides of the head above, the thorax, coxæ and femora of the legs and the node of the pedicel dull rusty red; flagellum of the antennæ lighter red, tibiæ and tarsi dark castaneous brown. The whole insect very finely and densely punctured, granulate, opaque, and moderately covered with erect hairs. Head similar in shape to that of *C. compressus* ☿ *max.*, but the mandibles are 6- not 7-toothed, the clypeus is very

feebly carinate, the median lobe is very shortly produced, and its anterior margin is notched in the middle; the scape of the antennæ is quadrangular and the lateral occipital angles are not so prominent. The thorax is comparatively short and narrow, the legs long and powerful, the metatarsi depressed and flattened. Node of the pedicel rather small, convex in front, flat posteriorly, its upper margin notched in the middle; abdomen massive.

☿ *min.* Similar, smaller, more slender; mandibles with 5 teeth; scape of the antennæ flattened towards apex; head narrower; legs comparatively longer.

♀. Similar to the ☿ *maj.* but larger; the thorax and abdomen not opaque, but distantly punctured and shining; the mesonotum

Fig. 114.—*Camponotus mistura*, ♀.

is flat above, and the metathorax abruptly truncate posteriorly; wings fulvo-hyaline, nervures yellow.

Length, ☿ *maj.* 14–16; ☿ *min.* 9–10; ♀ 15–17 mm.

Hab. Tenasserim (*Bingham*); extending in the Malayan subregion to Borneo (*Brit. Mus.*).

417. **Camponotus siemsseni**, *Forel, Jahrb. Hamburg. Wissen. Anstalt*, xviii (1901), p. 70, ☿ maj., ♀; *Ann. Soc. Ent. Belge*, xlvi (1902), p. 287.

☿ *maj.* Resembles somewhat in form the largest ☿ of *C. compressus*, but is more massive, with the head larger, but not quite so large as in *C. mistura*, Smith. Black, the scape of the antennæ at base, the flagellum and the legs chestnut-red; head, thorax and abdomen smooth and shining, the head in certain lights very minutely, the thorax more distinctly rugulose, the latter anteriorly somewhat subopaque, the abdomen polished. Pilosity very sparse, represented by only a few scattered pale hairs; pubescence very fine and sparse, only to be seen in certain lights, on the antennæ and legs it is a little more pronounced. Head very large, larger proportionately than in *C. compressus*, broader posteriorly than in front, the occiput widely emarginate; mandibles broad, the

masticatory margin strongly dentate; clypeus lightly tectiform, the medial lobe shortly produced, the anterior margin nearly transverse; antennal carinæ as in *C. compressus*; antennæ short, slender, the scape not extending to the top of the head. Thorax in profile arched above the apex of the metanotum, truncate; the legs long, the posterior tibiæ not prism-shaped, slightly compressed, almost cylindrical. Node of pedicel cuneiform, broad and transverse above; abdomen high, convex, anteriorly steep and rounded.

☿ *min.* Resembles the ☿ *maj.*, the head proportionately not so massive, the scape of the antennæ longer, reaching above the top of the head; the arch of the thorax slighter and continued down almost to the apex of the metanotnm, which is very slightly trnncate; pedicel and abdomen proportionately smaller but similar to those of the ☿ *maj.*

"♀. Wings light brownish yellow, with bright brown nervures. Metanotum like the legs, yellowish red. Mandibles with 6 teeth. For the rest similar to the ☿ *maj.*" (*Forel.*)

Length, ☿ *maj.* 12–13; ☿ *min.* 5; ♀ 18 mm.

Hab. Recorded from 3500 ft. in the Himalayas (*Smythies*); Siam, and extending to the Malayan subregion.

418. **Camponotus barbatus**, *Roger, Berl. ent. Zeit.* vii (1863), p. 138, ☿ ♀; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), p. 224, ☿.

"☿. At first sight closely resembles *C. marginatus*, Latr. (*fallax*, Nyl.); like that species it is black, with reddish antennal joints (especially of the flagellum) and tarsi; coxæ yellow. The erect pubescence is yellow, moderately long and not dense on the thorax, but on the other hand very dense on the head, the sides of which are set with a thick row of hairs, and beneath the hair is very long and voluminous. Tibiæ of the legs and scape of the antennæ with erect hairs. Head unusually elongate, qnadrangular, with the sides parallel, emarginate posteriorly and polished, lightly transverse behind, in front very feebly and finely pnnctured like a net. Node of pedicel polished, oval above, rounded or nearly truncate. Abdomen transverse rngose, yellow and globose. Legs brown, without erect hairs.

"♀. Entirely resembles the ☿, though the sides of the head are not so richly pubescent as the npper and under sides, perhaps the hair is only abraded. Wings light yellow. 9 mm. long. The node of the pedicel is lightly emarginate above." (*Roger.*)

Length, ☿ 6·7; ♀ 9 mm.

Hab. Ceylon (*Roger*). Unknown to me.

419. **Camponotus festinus**, *Smith* (Formica), *Proc. Linn. Soc.* ii (1857), p. 53, ♀; *id. Cat.* vi (1858), p. 23, ♀; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), p. 228, ☿.

☿ *maj.* Resembles *C. compressus*, ☿ *maj.*, but is a shorter and very much more stoutly built insect, it differs also in being shining and

not opaque. Dark castaneous brown, nearly black, flagellum of the antennæ and legs yellowish brown; pubescence very sparse, consisting of only a few scattered hairs. Head triangular, very broad at the base, lateral occipital angles remarkably prominent; anterior margin of clypeus transverse, emarginate on either side, the median portion not produced. Thorax short; prothorax much narrower than the head. Node of pedicel not nearly so convex in front as in *C. compressus*; abdomen longer, broader and more massive than in that species.

☿ *min.* Similar, more slender, more polished and shining; head elongate, almost rectangular; mandibles with 5 teeth.

♀. Resembles the ☿ *maj.*; head comparatively not so large, the cheeks not so convex, the occiput transverse; the mesonotum elongate, almost flat above; the metanotum rounded, steeply sloped to apex and somewhat gibbous. Abdomen remarkably massive.

Length, ☿ *maj.* 13–14; ☿ *min.* 10–12; ♀ 19–21 mm.

Hab. This species was originally described from Borneo, but in the Brit. Mus. there are specimens from Java and China, and one specimen labelled Burma.

420. **Camponotus rufoglaucus**, *Jerdon* (Formica), *Madr. Jour. L. S.* (1851), p. 124; *Smith* (Formica), *Cat.* vi (1858), p. 16; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 226 & 237, ☿.
Camponotus redtenbacheri, *Mayr, Verh. zool.-bot. Ges. Wien,* xii (1862), pp. 667 & 770, ☿.

☿ *maj.* Head and thorax blood-red, abdomen brown; the whole insect covered with a very fine, close, silky pilosity and sparsely with erect hairs. Head subtriangular, occiput widely emarginate; mandibles comparatively small, with 7 teeth; clypeus carinate, the median lobe shortly anteriorly produced, its margin crenate. Thorax comparatively narrow; legs with the tibiæ only slightly compressed. Node of the pedicel not so thick as in *C. compressus*, only slightly convex anteriorly. Abdomen large and massive.

☿ *min.* Very much more slender; head elongate, the sides straight; mandibles with 5 teeth; anterior margin of the slightly produced median lobe of clypeus arched, not transverse. Node of pedicel conical, thicker proportionately.

Length, ☿ *maj.* 9–10; ☿ *min.* 5–9 mm.

Hab. Delhi (*Bingham*); Central India (*Schurr*); the Deccan (*Wroughton*); Travancore (*Ferguson*); Ceylon (*Yerbury*); Assam (*Smythies*); Upper Burma (*Fea, Bingham*).

A species varying somewhat in the amount of red on the head and thorax, some specimens have only the head red. This and the succeeding species can be distinguished at once by their remarkably silky lustre, especially on the abdomen.

421. **Camponotus paria**, *Emery*.
Camponotus micans, *Nyl., race* paria, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 513, ☿.
Camponotus rufoglaucus, *Jerd., race* paria (*Emery*), *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 226 & 238, ☿.

☿ *maj.* Closely resembles *C. rufoglaucus*, Jerd., but the examination of a long series of each shows the following structural differences besides the constant difference of colour:—The produced median lobe of the clypeus has its lateral angles more or less rounded, and there is generally an emargination or notch in the middle of the margin. In *rufoglaucus*, the anterior margin of the median lobe is transverse. The node of the pedicel is broader, thinner and flatter than in *C. rufoglaucus*, and the silky pilosity is more dense and more equally spread. This species is black, with the posterior margins of the abdominal segments testaceous yellow.

☿ *min.* Similar, more slender; the head elongate, compressed posteriorly; mandibles with 5 teeth.

♀. Very similar to the ☿ *maj.*, but the head longer, the sides less convex, and the occiput transverse. Node of the pedicel similar in shape, but thicker than in the ☿ *maj.*

Length, ☿ *maj.* 9–10; ☿ *min.* 5–7; ♀ 14 mm.

Hab. Apparently throughout India, Assam, Burma and Ceylon. I have found nests of this species side by side with those of *C. rufoglaucus.*

422. **Camponotus dolendus**, *Forel*.
Camponotus rufoglaucus, *Jerd., race* dolendus, *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 227 & 238, ☿.

☿ *maj.* Resembles *C. paria*, Emery, but entirely wants the silky lustrous pubescence; on the contrary, it is opaque dead-black, with the posterior margins of the abdominal segments much more narrowly testaceous. Head with the sides more convex; clypeus with the medial lobe distinctly rectangularly produced. Thorax short and broad; legs with the tibiæ compressed and with scattered spines on their underside. Node of pedicel and abdomen as in *C. paria.*

☿ *min.* Similar, more slender, the head narrower, oval, rounded, but not compressed posteriorly; the pronotum, mesonotum and basal half of the metanotum form a gentle curve, apical half of the last steeply sloped, almost truncate. Node of the pedicel conical.

Length, ☿ *maj.* 8–9; ♀ *min.* 6–7 mm.

Hab. The N.W. Himalayas above 5000 ft. (*Smythies*); Sikhim (*Möller*).

423. **Camponotus nicobarensis**, *Mayr, Novara Reise, Formicid.* 1865, p. 31, ☿; *Forel* (*var.* exiguoguttatus), *Jour. Bomb. N. H. Soc.* vii (1892), pp. 229 & 240; *Emery* (*var.* monticola), *Ann. Mus. Civ. Gen.* xxxiv (1894), p. 479.

☿ *maj.* Brownish red, subcoriaceous, opaque, the posterior

portion of the abdomen shaded with fuscous. Head subtriangular, articulation of mandibles distinctly but slightly remote from the lower corner of the cheeks; mandibles short and broad, with 7 teeth; clypeus subcarinate and sublobed; occiput emarginate. Thorax short, moderately broad; legs short, tibiæ very distinctly flattened and longitudinally channeled. Node of pedicel slightly convex anteriorly, rounded above, concave behind; abdomen subglobose.

☿ *min.* Slighter, smaller, and lighter in colour; head oval; thorax proportionately longer; femora and tibiæ of the legs more compressed. Node of pedicel conical.

Length, ☿ *maj.* 7–8; ☿ *min.* 5–7 mm.

Hab. Assam (*Long*); Burma (*Fea*, *Bingham*); the Nicobars (*teste Mayr*); Cochin China (*André*).

Var. *exiguoguttatus*, Forel, and var. *monticola*, Emery, are darker coloured varieties of Mayr's species. This species is fairly common in the hills in Burma.

424. **Camponotus carin** (*Emery*), *Dalla Torre, Cat. Hym.* vii (1893), p. 223.

Camponotus dorycus, *Smith, race* carin, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 512, ☿; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), p. 226, ☿.

☿ *maj.* Head and scape of the antennæ black; flagellum, thorax and abdomen reddish, somewhat fuscous brown, legs pale yellowish brown; head opaque, thorax and abdomen subopaque, slightly glossy. Head elongate, oval, the occiput transverse, but the occipital angles not prominent; mandibles with 6 teeth; clypeus rather narrow, vertically carinate down the middle, median lobe slightly produced. Thorax remarkably long proportionately: prothorax narrowed anteriorly into a neck, about twice as long as broad; legs very long, tibiæ very slightly compressed, longitudinally channeled. Node of pedicel very thick at base, low and conical; abdomen narrow oval.

☿ *min.* Similar, more slender; head narrowed posteriorly; mandibles with 5 teeth.

Length, ☿ *maj.* 11–12; ☿ *min.* 8–10 mm.

Hab. Burma (*Bingham*); Tenasserim (*Fea*).

425. **Camponotus lamarcki**, *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 226 & 236, ☿.

☿ *maj.* Reddish testaceous to dark brownish black, reticulate-punctate, opaque; pubescence somewhat dense, especially on the head and thorax above, erect, reddish yellow. Head long, triangular, broadest below the vertex, the occipital angles rounded; mandibles rather small, with 7 teeth; clypeus vertically carinate down the middle, median lobe slightly produced, its anterior margin distinctly but very slightly and widely emarginate. Thorax elongate, metanotum very strongly laterally compressed; legs long,

tibiæ prism-shaped, longitudinally channeled. Node of pedicel narrow anteriorly at base, flat above, slightly convex, the margin transversely rounded; abdomen elongate oval.

☿ *min.* Similar, smaller; head oval, occiput rounded; mandibles with 5 teeth; thorax proportionately narrower. Node of the pedicel flat behind, very convex anteriorly.

Length, ☿ *maj.* 11–13; ☿ *min.* 7–10 mm.

Hab. Northern India (*Smythies*); Sikhim (*Möller*).

426. **Camponotus angusticollis,** *Jerdon* (Formica), *Madr. Jour. L. S.* xvii (1851), p. 120, ☿ ♀; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 226 & 235.

Formica ardens, impetuosa & callida, *Smith, Cat.* vi (1858), pp. 17 & 18.

Camponotus prismaticus, *Mayr, Verh. zool.-bot. Ges. Wien,* xii (1862), p. 669, ☿.

☿ *maj.* Black, opaque, the flagellum of the antennæ and the apical two or three joints of the tarsi brownish yellow. Head subtriangular, occipital angles prominent but rounded; mandibles with 6 teeth; clypeus with a very prominent medial vertical carina ending in a sharp point, and a broad median lobe transverse in front and only very shortly produced; occiput more or less widely

Fig. 115.—*Camponotus angusticollis,* ☿ maj.

emarginate. Thorax elongate and narrow; legs elongate, rather slender; tibiæ prism-shaped, compressed and longitudinally channeled. Node of pedicel thick, the front at base flat, above very convex, the upper margin transverse and notched, posteriorly flat and truncate; abdomen massive, oval.

☿ *min.* Head very much smaller, elongate, wider at the articulation of the mandibles than at the vertex, occiput very strongly

Fig. 116.—*Camponotus angusticollis,* ☿ min.

constricted and elongated into a neck. Thorax constricted and narrowed in front. Black, the flagellum of the antennæ and legs fuscous brown.

♀. Very similar to the ☿ *maj.*; mesonotum in front and scutellum very gibbous. Node of pedicel much wider; abdomen very massive and heavy.

Length, ☿ *maj.* 17–21; ☿ *min.* 12–15; ♀ 18 mm.

Hab. Western and Central India (*Jerdon*, *Wroughton*); Assam (*Smythies*); Burma, Maymyo, 3000 ft., and the plateaux in the Shan States (*Bingham*). In Assam and Burma the black form is replaced by var. *sanguinolentus*, Forel, varying in colour from a light yellowish red to a deep maroon-red, with, in some of the ☿ *maj.*, a black head and legs.

427. **Camponotus invidus**, *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 225 & 234, ☿.

☿ *min.* Pale yellow, with very sparse erect yellowish pubescence. Head from in front more or less elongate oval, the occiput somewhat constricted, sides of the head straight not convex; mandibles with 6 teeth; clypeus comparatively broad, medial carina indistinct; median lobe scarcely produced; antennæ comparatively long and thick. Thorax very convex anteriorly, giving a high-shouldered look to the insect, strongly laterally compressed posteriorly, with the pro-, meso- and metanotum more strongly curved than in most species; legs stout, tibiæ cylindrical. Node of the pedicel low, convex in front, flat posteriorly; abdomen comparatively long and massive.

Length, ☿ *min.* 5–6 mm.

Hab. Orissa (*Taylor*).

The ☿ *maj.*, ♀ and ♂ are unknown.

428. **Camponotus binghami**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 398, ☿ min.; *Ann. Soc. Ent. Belge*, xlvi (1902), p. 285, ☿ maj.

"☿ *maj.* Head absolutely rectangular, emarginate in front and at back, longer by a good fourth than broad, subtruncate in front. Mandibles armed with 6 teeth, punctured, striate or shagreened and opaque towards their base. Median portion of the clypeus much longer than broad, enlarged posteriorly where its sides are convex, impressed in front, and feebly grooved in the middle of its posterior half. Eyes somewhat in front of the posterior third of the head. Mesonotum very distinct, submargined. Node of the pedicel thick, but less obtuse on its upper margin than in the ☿ *min.* Front of the head reticulate-punctate, opaque, studded with large elongate punctures irregular and piligerous, abundantly covered with short, thick, obtuse yellow hairs, which are less abundant on the ☿ *min.* Clypeus and cheeks yellowish red; antennæ entirely brown, except at the base of the scape which is reddish. Head less pubescent than in the ☿ *min.* For the rest resembling the latter." (*Forel.*)

☿ *min.* Black; the mandibles, antennæ and legs dark castaneous brown, the whole insect covered with a fairly dense, short,

recumbent white pubescence, and more sparsely with longer erect pale yellow hairs. Head elongate, occiput rounded and sloped posteriorly, but slightly wider posteriorly than anteriorly; mandibles comparatively broad, with 5 teeth; clypeus broad, convex, strongly carinate down the middle and sublobed; antennæ long and somewhat thick. Thorax proportionately rather broad, the mesonotum large and slightly gibbous; legs long and robust, the tibiæ cylindrical. Node of pedicel thick, biconvex, the upper margin rounded and fringed with long erect hairs; abdomen broadly oval.

Length. ☿ *maj.* 6·5–7; ☿ *min.* 3·5–5 mm.

Hab. Upper Burma, Mandalay (*Bingham*); Tenasserim (*Hodgson*). I did not procure the ☿ *maj.* and quote Dr. Forel's description.

429. **Camponotus crassisquamis**, *Forel, Ann. Soc. Ent. Belge*, xlvi (1902), p. 286, ☿ maj. et ☿ min.

☿ *maj.* Fuscous black; the abdomen with a bluish metallic reflection as in *Lobopelta chinensis*, and the margins of the segments yellow; the lateral occipital angles, masticatory margins of the mandibles, the flagellum of the antennæ and the legs reddish brown. Pilosity reddish yellow, long and abundant, especially on the front of the head and the abdomen above; pubescence, except on the flagellum of the antennæ where it is sparse, entirely wanting. Head reticulate-punctate, subopaque, longer than broad, the occiput slightly emarginate, nearly transverse, the cheeks very convex; eyes lateral, placed somewhat to the front; mandibles dull, subopaque, with a few coarse punctures; clypeus longitudinally medially carinate for one-third of its length from base, the median lobe shortly produced and rectangular; antennæ long and slender, the scape extending beyond the top of the head by about a fourth of its own length. Thorax reticulate-punctate, subopaque, strongly compressed posteriorly; legs long and slender, the tibiæ not spinous beneath. Node of pedicel very thick in profile, triangular, with a rounded top and not high, its upper margin lower than the dorsum of the metanotum; abdomen massive, broadly oval.

☿ *min.* Resembles the ☿ *maj.*, but is smaller and with a proportionately smaller head, which viewed from the front is oval with the occiput rounded; the abdomen is shorter, roundly oval and very convex.

Length, ☿ *maj.* 8; ☿ *min.* 5·5–6·5 mm.

Hab. Assam (*Smythies*); Bhamo, Upper Burma (*Bingham*).

The Burmese specimens vary somewhat in colour, one ☿ *maj.* has the head and thorax dull red, somewhat like *C. rufoglaucus*, but then it lacks the fine silky pubescence of the latter, and from the shape of the node of the pedicel it is clearly *C. crassisquamis*.

430. **Camponotus gigas**, *Latr.* (Formica), *Hist. Nat. Fourm.* (1802), p. 105, ☿, pl. 2, fig. 36; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), p. 225, ☿.

☿ *maj.* Head, thorax, legs and node of pedicel pitch-black, apical joints of the tarsi and abdomen castaneous brown or red, the basal two segments of the latter shaded with fuscous brown; head nearly devoid of pubescence; thorax and abdomen covered rather sparsely with erect brown hairs. Head comparatively very large, subtriangular, the sides straight, the occiput deeply emarginate, lateral occipital angles rounded but remarkably prominent; mandibles elongate, toothed on the inner as well as on the masticatory margin; clypeus comparatively narrow, with a medial vertical carina and a very prominent median lobe, the anterior margin of which is subemarginate; scape of antennæ cylindrical. Thorax comparatively narrow; legs very long, tibiæ compressed and longitudinally channeled. Node of pedicel conical, very convex anteriorly; abdomen broad.

☿ *min.* Similar; head rounded posteriorly, flagellum of the antennæ, coxæ and femora of the legs and the abdomen castaneous.

♀. Similar to ☿ *maj.*; head smaller, narrower and less deeply emarginate posteriorly; wings hyaline yellow, brown along the costal margin. Node of pedicel thick, transverse, notched above.

♂. Similar to the ☿ *min.*; head proportionately very small, the cheeks concave, head behind the occiput strongly constricted. Entirely of a dark brownish black, coxæ and femora of the legs testaceous yellow.

Length, ☿ *maj.* 27–30; ☿ *min.* 13–18; ♀ 28–30; ♂ 19 mm.

Hab. The Malay Peninsula, Borneo, Sumatra, creeping into the extreme south of Tenasserim. Mergui district (*Bingham*).

431. **Camponotus marginatus**, *Latr.* (Formica), *Ess. Hist. Fourm. Fr.* (1798), p. 35, ☿ ♀; *Forel* (*var.* himalayanus), *Jour. Bomb. N. H. Soc.* vii (1893), p. 431, ☿.

☿ *maj.* Head and thorax black, head slightly polished and shining, thorax opaque, legs brownish red; abdomen dark castaneous brown, polished and shining; pubescence sparse, erect, more plentiful on the abdomen. Head subtriangular, very convex in front; mandibles short, very massive, striate and deeply punctured; clypeus comparatively small, sublobed, not carinate, its anterior margin slightly denticulate. Thorax broad in front, abruptly truncate posteriorly; legs stout, tibiæ slightly flattened. Node of pedicel broad, oval, slightly biconvex and rounded above; abdomen broad and massive.

☿ *min.* Similar, smaller, more pubescent; head not constricted or attenuated posteriorly; mandibles with 6 teeth.

♀. Very similar to the ☿ *maj.*; head slightly narrower. Node of pedicel broader, notched in the middle above; abdomen very much longer and more massive.

♂. Very much smaller than the ♀ and darker, almost black; head triangular, very small, rounded posteriorly; thorax raised and gibbous. Node of pedicel a little thicker; abdomen much smaller, oval.

Length, ☿ *maj.* 10–11; ☿ *min.* 7–9; ♀ 13–15; ♂ 7 mm.

Hab. The North-west Himalayas (*Smythies*); also in Europe and North America.

432. **Camponotus mendax.**

Camponotus sericeus, *var.* mendax, *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 454, ☿.

☿ *maj.* Head and legs of an obscure dull red, thorax, node of the pedicel and abdomen brown; the head sparsely, the thorax and abdomen densely covered with a silky golden recumbent pubescence, and also with fairly thickly-set pale yellow erect hairs. Head massive, broad at the occiput, the lateral occipital angles rounded but prominent; mandibles with 6 teeth; clypeus broad, not carinate nor lobed, its anterior margin transverse, denticulate. Thorax very broad in front, narrowing posteriorly, but the metanotum remarkably broad, its basal portion forming a regular curve, with the pro- and mesonotum and the apical half more steeply sloped, obliquely truncate; legs comparatively long, the tibiæ compressed and longitudinally channeled. Node of pedicel very thick, strongly biconvex and transverse above; abdomen large and massive.

♀. Black, opaque, the apical half of the mandibles, the antennæ and apical joints of the tarsi reddish. Head smaller and squarer than in the ☿ *maj.*; abdomen longer and more massive. Head, thorax and abdomen with scattered pale erect hairs, but entirely devoid of the beautiful golden pile so conspicuous on the ☿ *maj.*

☿ *min.* Unknown.

Length, ☿ *maj.* 10; ♀ 12 mm.

Hab. Southern India, Mysore (*Wroughton*).

M. Forel regards this and another form, which he has named var. *integer*, as varieties of *C. sericeus*, Fabr. I have described *C. mendax* from specimens in Mr. Wroughton's collection named, I believe, by M. Forel, and it seems to me a good species. *C. integer*, Forel, is unknown to me, but is described as very like *C. sericeus*, except that the thorax is equally convex anteriorly and posteriorly, with no emargination at the meso-metanotal suture. It is variegated with brownish and ferruginous.

433. **Camponotus japonicus**, *Mayr, Verh. zool.-bot. Ges. Wien*, xvi (1866), p. 885, ☿.

Camponotus herculeanus, *Linn.*, *subsp.* pensylvanicus, *de Geer*, *var.* punctatissimus, *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 477, ☿; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 455.

☿ *maj.* Black, very closely and finely reticulate-punctate: head

sparsely, thorax and abdomen somewhat densely pubescent, pubescence crect on head and thorax, oblique and recumbent on the abdomen, of a yellowish-red colour. Head very large, very convex on the sides, occiput emarginate, lateral angles very prominent; clypeus not carinate, slightly convex and bi-emarginate anteriorly. Thorax very broad in front, suddenly laterally compressed posteriorly, only slightly arched above, the posterior half of the metanotum suddenly and obliquely truncate; legs stout, tibiæ slightly flattened and longitudinally channeled. Node of pedicel comparatively thick; abdomen short, broadly oval.

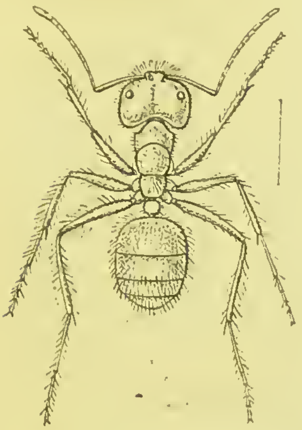

Fig. 117.—*Camponotus japonicus*, ☿ maj.

☿. Similar, slighter, head much smaller proportionately, clypeus tectiform, slope of metanotum less steep, femora and tibiæ strongly compressed.

Length, ☿ *maj.* 11–13; ☿ *min.* 8–10 mm.

Hab. The Karen and Shan hills, Burma (*Bingham*), extending through China to Japan.

434. **Camponotus radiatus**, *Forel, Jour. Bomb. N. H. Soc.* vii (1892), pp. 225 & 233, ☿.

☿ *maj.* Unknown.

☿ *min.* Jet-black, densely opaque, with a granular appearance, clothed scantily with hoary white crect hairs, chiefly on the posterior portion of the thorax, the node of the pedicel and abdomen; on the node of the pedicel they form a fringe radiating outwards in a circle; underneath this is a denser but still widely spaced covering of very short yellowish-white hairs all over the head, thorax and abdomen. Head somewhat square, a little broader posteriorly than in front; mandibles with 5 teeth; clypeus tectiform, with a very shortly produced median lobe. Thorax rather broad, pronotum depressed, rounded in front, metanotum truncate posteriorly; legs comparatively long, the tibiæ prism-shaped. Node of pedicel cuneiform, broadly oval; abdomen broad, slightly depressed and massive.

Length, ☿ *min.* 5·5 mm.

Hab. Western India, Kanara (*Wroughton*).

This species is very closely allied to *C. carbonarius*, Latr., which is unknown to me, but the description of which is quoted by M. Forel.

435. **Camponotus yerburyi**, *Forel.*
Camponotus reticulatus, *Roger, race* yerburyi, *Forel, Jour. Bomb. N. H. Soc.* vii (1893), p. 431, ☿.

☿ *maj.* Dull black, rather coarsely but sparsely punctured and covered with short stiff white hairs; mandibles, antennæ and legs reddish brown, posterior margins of the abdominal segments broadly transparent white. Head seen from in front rectangular, as broad in front as posteriorly; mandibles short, with 6 teeth; clypeus indistinctly carinate down the middle, median lobe slightly produced, emarginate anteriorly. Thorax comparatively very broad across the pro- and mesonotum and basal half of metanotum; apical half of metanotum obliquely truncate; legs short and stout, tibiæ cylindrical. Node of pedicel laminate, broad, flatter in front than posteriorly; abdomen short and broad.

☿ *min.* Similar; head smaller, more oval, narrowed posteriorly; mandibles, antennæ, legs and abdomen reddish brown.

Length, ☿ *maj.* 5–5·5; ☿ *min.* 4–4·5 mm.

Hab. Ceylon (*Yerbury*).

436. **Camponotus reticulatus**, *Roger, Berl. ent. Zeit.* vii (1863), p. 139, ☿; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), p. 224, ☿.

☿ *maj.* Brownish red, opaque and granulate, studded sparsely with short, erect, white hairs, the abdomen with transverse white semi-transparent bands at the junctions of the segments. Head longer than broad, as broad in front as posteriorly, the occipital angles not prominent, rounded, but the occiput transverse; mandibles with 5 teeth; clypeus narrow, slightly convex, not carinate, and with no distinct lobe. Thorax broad; the pro- and mesonotum large, the basal half of the metanotum slightly flat and depressed, its sides finely longitudinally striate, apical half obliquely truncate; legs stout, tibiæ cylindrical. Node of pedicel thick, transverse above, convex posteriorly; abdomen elongate, massive.

☿ *min.* Similar, more slender; head smaller and more oval; clypeus tectiform. Node of pedicel not so thick.

Length, ☿ *maj.* 6; ☿ *min.* 4 mm.

Hab. Ceylon (*Yerbury*). M. Forel has separated a variety under the name *C. reticulatus* var. *latitans*.

437. **Camponotus wroughtoni**, *Forel, Jour. Bomb. N. H. Soc.* vii (1893), p. 430, ☿.

☿ *maj.* Dark castaneous brown; legs slightly lighter in colour, posterior margins of the abdominal segments testaceous; head, thorax and abdomen glabrous, shining. Head almost square, as broad at the articulation of the mandibles as across occiput; mandibles short and broad, teeth almost obsolete; clypeus with a very distinct medial vertical carina, median lobe slightly produced, rounded in front. Thorax short and comparatively broad; legs

stout, tibiæ more or less compressed and longitudinally channeled. Node of pedicel biconvex; abdomen broad and massive.

☿ *min.* Similar, smaller and slighter, slightly more pubescent; head more elongate; legs comparatively longer, tibiæ cylindrical.

♀. Similar to the ☿ *maj.*; head more elongate and rounded posteriorly. Node of pedicel thicker and broader, abdomen more massive.

♂. Similar to the ♀, but with a very much smaller head, the mesonotum with a medial and two laterally impressed longitudinal lines; head and thorax opaque, densely and very finely reticulate-punctate.

Length, ☿ *maj.* 7–8; ☿ *min.* 5–6·5; ♀ 8·5; ♂ 6 mm.

Hab. The Himalayas (*Smythies*); Upper Burma, the Shan States at 4000 ft. (*Bingham*).

438. **Camponotus camelinus**, *Smith* (Formica), *Proc. Linn. Soc.* ii (1857), p. 57, ☿; *id.* (Formica). *Cat.* vi (1858), p. 23, ☿; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), p. 224, ☿.
Formica singularis, *Smith, Cat.* vi (1858), p. 27, ☿.

☿ *maj.* Black, covered with a thin brownish sericeous pile and rather more densely with erect brownish hairs; head, thorax and

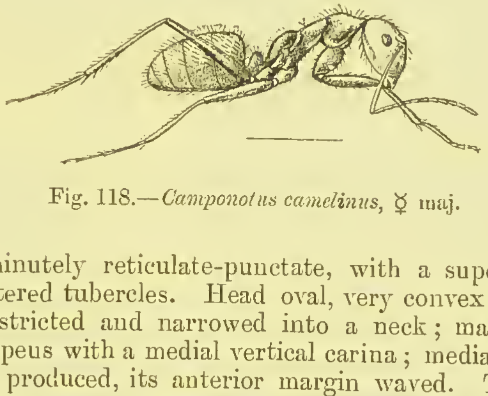

Fig. 118.—*Camponotus camelinus*, ☿ maj.

abdomen minutely reticulate-punctate, with a superposition of minute scattered tubercles. Head oval, very convex in front, the occiput constricted and narrowed into a neck; mandibles with 7 teeth; clypeus with a medial vertical carina; median lobe broad and slightly produced, its anterior margin waved. Thorax elongate narrow, meso-metanotal suture emarginate; legs very long, the tibiæ cylindrical. Node of pedicel rounded; abdomen comparatively massive.

☿ *min.* Very similar. Head and abdomen much smaller. Node of pedicel more globose.

♀. Similar to the ☿ *maj.*, but more elongate and with a proportionately larger abdomen; node of pedicel elongate oval.

Length, ☿ *maj.* 14–15; ☿ *min.* 11–12; ♀ 17 mm.

Hab. Sikhim (*Möller*); Burma; Tenasserim (*Bingham*). *C. singularis*, Smith, is only a variety of which the head is invariably of a blood-red colour. Both forms are common in Burma.

439. **Camponotus holosericeus**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 515, ☿; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), p. 224, ☿.

☿ *maj.* Black, covered with a fine, silky, recumbent, shining yellowish pubescence mixed with a few erect white hairs. Head, thorax and abbomen very finely and closely reticulate-punctate with superficially widely spaced shallow punctures. Head very broad above and massive, the lateral occipital angles remarkably prominent and separated from the middle portion of the occiput by shallow, rather wide sulcations; mandibles with 6 teeth; clypeus higher than broad, medially vertically carinate, median lobe very little produced. Thorax elongate, narrow, emarginate at the meso-metanotal suture, the gibbosity of the metanotum remarkably prominent. Node of pedicel very thick, nearly square, convex on both sides; abdomen very broad and short.

Fig. 119.—*Camponotus holosericeus*, ☿ maj. Thorax.

☿ *media et min.* Much more slender, the head rounded posteriorly; the mandibles with 5 or 6 teeth; the node of the pedicel in the intermediate form similar to that in the ☿ *maj.*; abdomen longer, not so broad. In the ☿ *min.* the legs are dull castaneous red, and the node of the pedicel is globose.

Length, ☿ *maj.* 15; ☿ *media* 12; ☿ *min.* 9 mm.

Hab. Upper Burma, the Chin Hills (*Watson*); Tenasserim, Haungdraw Valley (*Fea*; *Bingham*).

440. **Camponotus auriventris**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 514, ☿; *Forel, Jour. Bomb. N. H. Soc.* vii (1892), p. 224, ☿.

☿ *maj.* Black, opaque; the head, thorax and node of the pedicel closely and finely reticulate-punctate and superficially marked with more scattered widely spaced large punctures, remarkably coarse, almost confluent on the metanotum and node of pedicel; abdomen with a dense shining golden pubescence hiding the sculpture, pubescence on head and thorax very sparse and erect. Head rather elongate, truncate at the occiput; mandibles with 7 teeth; clypeus prominently carinate down the middle, the median lobe very short. Thorax not so long proportionately as in *C. holosericeus*, but similar, with a gibbous metanotum. Node of pedicel globose; abdomen broad, subglobose.

☿ *min.* Similar, the sides of the head parallel, the vertex very high and rounded; mandibles with 6 teeth.

Length, ☿ *maj.* 15; ☿ *min.* 10–11 mm.

Hab. Upper Burma, Byingyi, 5000 ft. (*Bingham*); Tenasserim, Muleyit Mountain, 5000 ft. (*Fea*).

441. **Camponotus confucii**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 396, ☿.

☿ *maj.* Black, opaque ; flagellum of the antennæ brown, mandibles and legs castaneous. Head rather rectangular in shape, a little broader posteriorly than in front, the sides straight, very slightly convex ; mandibles with 6 teeth ; the clypeus depressed, slightly carinate, the median lobe rounded in front, only slightly produced, notched in the middle. Thorax short and broad, distinctly but not deeply emarginate at the meso-metanotal suture, the metanotum raised, rounded, gibbous ; legs short, the tibiæ cylindrical. Node of the pedicel rather thick, convex in front, transverse and slightly emarginate above, flat posteriorly ; abdomen broadly oval.

☿ *min.* Similar, smaller, but proportionately not more slender ; head similar, but the occiput rounded.

Length, ☿ *maj.* 7 ; ☿ *min.* 5–5·5 mm.

Hab. Western India, Kanara (*Wroughton*) ; Upper Burma, Katha ; Tenasserim, Thaungyin Valley (*Bingham*). Some specimens of the ☿ minor have the abdomen dark castaneous red.

442. **Camponotus wasmanni**, *Emery, Rev. Suisse Zool.* i (1893), p. 224, ☿ ♀ ; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 453, ☿ ♀.

☿ *maj.* Black, more or less thickly covered with erect hoary white pubescence ; mandibles bright castaneous red ; head, thorax and abdomen closely finely reticulate punctate, with a superficial sculpturing of large scattered punctures. Head very broadly triangular, almost as broad at the occipital angles as long ; clypeus with a prominent vertical carina and only a very shortly produced median lobe. Thorax short and broad, lateral angles of the prothorax subdentate, a distinct but narrow emargination at the meso-metanotal suture ; legs longish, rather slight, tibiæ only very slightly compressed. Node of pedicel roundly conical, knob-like, not much raised ; abdomen broadly oval, slightly depressed.

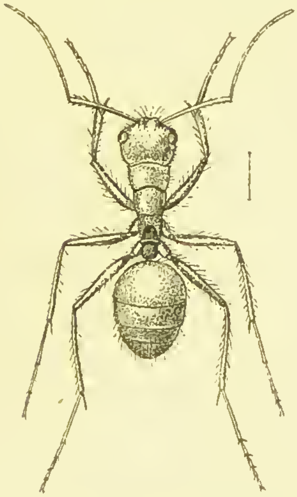

Fig. 120.—*Camponotus wasmanni*, ☿ maj.

☿ *min.* Similar, much smaller, with proportionately much smaller head ; thorax broadly articulated to the head, the lateral anterior angles distinctly dentate, the anterior margin of prothorax transverse, as wide as the head ; metanotum more distinctly raised and gibbous than in the ☿ *maj.*

♀. Similar to the ☿ *maj.*; node of pedicel proportionately not so thick; wings fusco-hyaline.

Length, ☿ *maj.* 11–12; ☿ *min.* 5–6; ♀ 13–14 mm.

Hab. Sikhim (*Möller*); Kumaun, 4000 ft., Assam (*Smythies*); Burma, Maymyo, 3000 ft.; Karen Hills, 5000 ft. (*Bingham*).

It is remarkable that all specimens from Burma should have the thorax and basal abdominal segment either entirely bright red or variegated with bright red. In sculpture and form they are identical with specimens from Sikhim and Assam. Emery (*loc. cit.*) has separated the Burmese variety as var. *mutilloides*.

443. **Camponotus sericeus**, *Fabr.* (Formica) *Ent. Syst. Suppl.* (1798), p. 279; *Forel, Journ. Bomb. N. H. Soc.* vii (1892), pp. 223 & 231, ☿.
Formica cinerascens, *Jerd. Madr. Jour. Lit. & Sc.* xvii (1851), p. 123, ☿ ♀ ♂.
Formica obtusa, *Smith, Cat.* vi (1858), p. 30.
Camponotus opaciventris, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 648, ☿.

☿ *maj.* Black, opaque, with a granular appearance on the head and thorax, antennæ and the tibiæ and tarsi of the legs more or

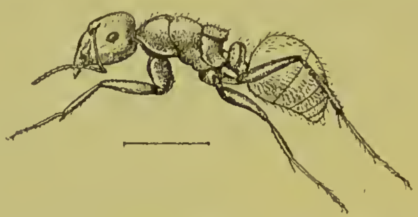

Fig. 121.—*Camponotus sericeus*, ☿ maj.

less dark castaneous; head, thorax and node of pedicel with very sparse erect pubescence; abdomen with a dense recumbent silky golden pubescence hiding the sculpture. Head very broad and massive, almost as broad across at the base of the mandibles as at the occiput, the latter more or less emarginate; mandibles with 5 teeth; clypeus broad, somewhat tectiform, the anterior border broadly emarginate in the middle. Thorax broad in front, strongly compressed posteriorly, emarginate at the meso-metanotal suture, the basal face of the metanotum horizontal, flat, the sides margined, posterior face excavate; legs stout, tibiæ cylindrical. Node of pedicel rounded, knob-like; abdomen very broad, globose.

☿ *min.* Similar, smaller; head more elongate proportionately, occiput rounded, anterior margin of clypeus transverse, antennæ and legs lighter in colour than in the ☿ major.

♀. Similar to the ☿ *maj.*; head rounder, occiput transverse, thorax not compressed, and the metathorax as in the ♀ of typical *Camponotus*. Node of pedicel thick but transverse, not globose; abdomen long and massive.

Length, ☿ *maj.* 8–10; ☿ *min.* 5–7; ♀ 11 mm.

Hab. More or less common throughout our limits. *C. opaciventris*, Mayr, is clearly only a variety, having no pubescence on the abdomen. The excavation of the posterior face of the metanotum varies in individuals from the same nest. Certain specimens from Burma and Ceylon have the head blood-red; others have the thorax and even the head more or less pubescent.

444. **Camponotus varians**, *Roger, Berl. ent. Zeit.* vii (1863), p. 138, ☿; *Forel, Journ. Bomb. N. H. Soc.* vii (1892), p. 223, ☿.

" ☿. Shining black, basal two abdominal segments yellow, antennæ and legs brownish yellow, the articulations, coxæ and tarsi bright yellow, or else wholly black with brown legs and antennæ. Body with sparse recumbent pubescence. Head a little broader than the thorax in front, with shallow net-like punctures, posteriorly more lightly transversely rugose, above all very shining. Clypeus convex, not carinate nor emarginate nor lobate. Mandibles 5-toothed in front, yellow, with the base brown with scattered punctures. Frontal area shining, finely rugulose. Thorax viewed from the side arched, above broad and more or less flat; pronotum much broader than long, rounded at the sides, separated from the mesonotum by a crescentic line, the anterior angles with acute margins; mesonotum transverse, flat posteriorly, somewhat sharply emarginate. Metanotum laterally strongly compressed, above about one-third as broad as the pronotum and longitudinally quadrangular, posteriorly abruptly truncate, slightly concave. Thorax above very finely, rather closely transversely rugose, the sides of the pronotum finely, those of the meso- and metanotum deeply longitudinally striate, in the latter the sculpture is dense, coarse, nearly granulate. Node lower than the metanotum, smooth, oval, rounded above, with a somewhat sharp margin on the sides. Abdomen thickly transversely rugose.

"*Length*, ☿ 3·4 mm.

"*Hab.* Ceylon." (*Roger*). Unknown to me.

445. **Camponotus nirvanæ**, *Forel, Journ. Bomb. N. H. Soc.* vii (1893), p. 443, ☿ ♀.

" ☿ *maj.* Mandibles short, obtuse, armed with 5 or 6 teeth, opaque or subopaque, extremely finely and densely reticulate, striate, nearly without punctures. Head rectangular, much longer than broad, subtruncate anteriorly, as in *C. reticulatus* race *yerburyi*, but a little broader posteriorly than in front, the occiput somewhat deeply emarginate. Eyes situated in the second fifth of the sides of the head posteriorly. Clypeus rectangularly rounded, much narrower in front than posteriorly, flat, not carinate, nor lobed nor emarginate in front, and almost without the lateral portions. Antennal carinæ long, distinct and very divergent. The scape does not reach the posterior margin of the head. The thorax broad, subdepressed above, without emargination, but with the

sutures deeply impressed. Basal portion of the metanotum submargined, rectangular, a little longer than broad, the apical sloping portion obliquely truncate, slightly concave, and submargined as in *C. reticulatus*. Node of pedicel very low, very broad, twice as broad as high, its upper margin obtuse, transverse; node moderately thick. Tarsi short.

"Rather densely reticulate and subopaque, occiput and vertex somewhat shining, feebly reticulate. Abdomen shining, rugulose. Front of the head a little more deeply reticulate-punctate, some large irregular fossæ on the clypeus and a very few on the cheeks.

"Pilosity erect, yellowish, very sparse, very short and a little obtuse, a row of hairs between the basal and apical portions of the metanotum. Tibiæ and scape with erect hairs or spines, with a thin, very fine, recumbent pubescence, which is still more sparse elsewhere on the body.

"Reddish, abdomen black. Mandibles and the anterior margin of the head dark brown. Node of the pedicel, coxæ and femora brownish.

"☿ *min.* Clypeus convex, somewhat distinctly carinate, lightly emarginate in the middle anteriorly, without a lobe, and much broader in front than posteriorly. Head broader in front than posteriorly, where it is very obtuse. Scape long, extending beyond the posterior angles of the head by a quarter of its own length. Pronotum with distinct shoulders and a median longitudinal impressed line. Upper portion of the thorax more depressed than in the ☿ *maj.* Mesonotum and the basal portion of the metanotum distinctly submargined. This latter more elongate than in the ☿ *maj.*

"For the rest resembles the ☿ *maj.*, but the upright hairs are longer and more pointed and the colouring deeper. Head and thorax of a deep brown; scape, base of the flagellum and the legs yellowish brown. Sculpture of the head not so distinct as in the ☿ *maj.* Clypeus almost without the coarse punctures. Mandibles as in the ☿ *maj.* but narrower.

"♀. Resembles the ☿ *maj.*, but the mandibles have, in addition, somewhat distinct scattered punctures, and the cheeks are more distinctly fossulate. Mesonotum densely reticulate-punctate, and opaque. Metanotum strongly convex. The colour resembles that of the ☿ *maj.*, but the front of the head and the scutellum are reddish, and the abdomen a reddish brown lighter than in the ☿. Wings subhyaline, slightly yellowish. Nervures and stigma of a pale yellow. The rest as in the ☿.

"*Length*, ☿ *maj.* 6·2; ☿ *min.* 4·8; ♀ 7·8 to 8 mm.

"*Hab.* Kanara, Western India (*Wroughton*).

"*C. nirvanæ* is close to *C. varians*, Roger, but larger, with the sculpture quite different." (*Forel.*)

Unknown to me.

446. **Camponotus luteus**, *Smith* (Formica), *Cat.* vi (1858), p. 19, ♀.
Formica tincta, *Smith, Cat.* vi (1858), p. 21, ♀.

♀. Reddish yellow, covered with a fine, rather sparse, erect, yellowish pubescence; head subtriangular, smooth, but not shining, with a few irregularly scattered punctures; mandibles with 7 teeth; clypeus vertically carinate, with anteriorly a rectangularly produced median lobe, not so long as in *C. compressus*. Thorax massive, the mesonotum gibbous; legs stout, femora broad, strongly compressed, tibiæ cylindrical. Node of pedicel wedge-shaped, not much more convex in front than posteriorly; abdomen broadly oval, depressed.

☿ unknown.

Length, ♀ 12 mm.

Hab. Northern India (*Brit. Mus.*); Burma (*Bingham*); Java (*Mayr*).

Described from the type in the collection of the British Museum. *Formica tincta* of Smith, the type of which, a ♀, is also in the British Museum collection, seems to me only a colour variation of this species. *C. tinctus* has the reddish yellow of the abdomen marked with three broad transverse black bands.

447. **Camponotus gretæ**, *Forel, Ann. Soc. Ent. Belge*, xlvi (1902), p. 288, ♀.

♀. Head and thorax reddish yellow; abdomen brown, with yellow bands lying over the apical margins of the segments and spreading narrowly along the bases of the succeeding segments; antennæ concolorous with the head, mandibles of a deeper reddish, legs yellow. Finely rugulose all over, somewhat shining, in certain lights subopaque, the front punctured; pilosity yellowish, fairly abundant and long, oblique, nearly recumbent, and shorter on the scape of the antennæ and on the tibiæ of the legs. Head longer than broad, strongly constricted anteriorly, occiput widely but slightly emarginate; mandibles with the masticatory margin very broad, armed with 6 teeth and one on the inner margin, the apical tooth long and acute; clypeus narrow and depressed, giving the head a truncate appearance anteriorly, posteriorly it is broadly rounded and anteriorly it is produced and narrowly rounded, the cheeks on each side of the clypeus slightly swollen; antennæ long, filiform, the scape striate at base and extending to the top of the head; eyes large, placed a little to the front in the upper third of the head. Thorax and abdomen as in *C. mitis*, ♀; pedicel with the node cuneiform, broad, transverse above; wings hyaline, nervures yellow.

Length, ♀ 13 mm.

Hab. Recorded only from the Thaungyin Valley, Tenasserim.

Genus HEMIOPTICA.

Hemioptica, *Roger, Berl. ent. Zeit.* vi (1862), p. 238, ☿.
Polyrhachis, pt., *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 17.

Type, *H. scissa*, Roger, from Ceylon.

Range. The Indo-Malayan region.

☿. Characters very like those of *Polyrhachis*, Smith, but the compound eyes, instead of being round and complete, are incised or truncate posteriorly. In the typical species, *H. scissa*, the thorax is almost divided into two parts by a deep and comparatively broad furrow at the meso-metanotal suture, the pronotum is triangular, the apex pointing backwards; the mesonotum is attenuate, consisting virtually of two triangular points, one on each side, sunk below the level of the pronotum; the basal portion of the metanotum is roundly curved, the apical portion, separated from the basal portion by a distinct transverse carina, slightly concave. In the ♀, however, the peculiar deep furrow succeeding the mesonotum is placed behind the scutellum; in the ☿ of the two other Indian species belonging to this genus it is wanting. The rest of the characters of *Hemioptica* are identical with those of the genus *Polyrhachis*.

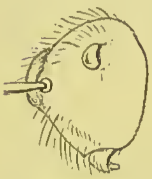

Fig. 122. *Hemioptica*, ☿ head.

Key to the Species.

a. A deep transverse furrow between the meso- and metanotum in the ☿	*H. scissa*, p. 380.
b. No furrow between the meso- and metanotum.	
a'. Densely pubescent	*H. pubescens*, p. 381.
b'. Not pubescent, a covering only of sparse erect hairs	*H. aculeata*, p. 382.

448. **Hemioptica scissa**, *Roger, Berl. ent. Zeit.* vi (1862), p. 240, ☿ ♀; *Forel* (Polyrhachis), *Jour. Bomb. N. H. Soc.* viii (1893), pp. 17 & 27, ☿ ♂.

☿. Black, shining, very minutely reticulate-punctate, the cheeks posteriorly a little more coarsely rugulose, and the sides of the thorax behind the meso-metanotal suture finely obliquely striate;

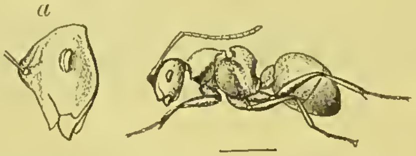

Fig. 123.—*Hemioptica scissa*, ☿. *a*. Head.

pubescence almost entirely absent, reduced to a few scattered hairs on the front of the head and apex of abdomen beneath. Head broadly oval; clypeus steeply tectiform, coming to a point in the

middle of the anterior margin ; antennal carinæ moderately long, placed in the middle of the face, on a raised vertical tubercle which is longer than broad, the carinæ somewhat close together and slightly convergent posteriorly. Thorax entirely unarmed and the form as given in the characters of the genus ; legs robust, tibiæ cylindrical, smooth, constricted for a third of their length from base. Node of the pedicel cuneate, the upper margin very thin and arched, bearing at its lateral angles an acute tooth ; abdomen globose.

♀. Similar to the ☿ ; larger ; wings hyaline with a brownish tint ; pronotum short, vertical ; mesonotum ample, convex ; scutellum transverse, very convex and gibbous ; postscutellum sunk in a deep wide furrow between the scutellum and the metanotum ; this last short, gibbous above, vertically truncate posteriorly.

Length, ☿ 6·7 ; ♀ 8 mm.

Hab. Ceylon (*Yerbury & Green*).

449. **Hemioptica pubescens**, *Mayr* (Polyrhachis), *Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 657, ☿.

Polyrhachis pubescens, *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 17 & 27, ☿ ♂.

☿. Resembles *Polyrhachis striata*, Mayr, but is much smaller and more slender. Black, covered with a fine sericeous silvery pubescence as in *Polyrhachis tibialis*, Smith, and more sparsely with short erect hairs ; head, thorax and abdomen finely punctured, opaque. Head short, as broad posteriorly as in front, the cheeks straight, not convex, the truncation of the eyes not so marked as in *H. scissa*, Roger ; clypeus convex, with a low medial tubercle at base, anteriorly arched, not emarginate ; antennal carinæ remarkably prominent, viewed from the side they form projecting lunate

Fig. 124.—*Hemioptica pubescens*, ☿.

laminæ. Thorax anteriorly as broad as the head, posteriorly narrowed, flat or slightly convex above and margined on each side along its whole length ; pronotal spines slender, acute, pointing divergently forward, basal portion of metanotum posteriorly transversely margined, the lateral angles with short erect points, apical portion concave ; legs slender, tibiæ cylindrical and without spines. Node of pedicel high, biconvex, surmounted at the lateral angles with short erect spines, the upper margin of the node between the two spines straight, the sides of the node with a lateral acute tooth very short and placed low down on the node ; abdomen globose.

Length, ☿ 8–9 mm.

Hab. Burma; Tenasserim (*Fea*, *Bingham*).

A variety with the lateral angles of the node flattened and produced has been separated as var. *alatisquamis* by Dr. Forel.

450. **Hemioptica aculeata**, *Mayr* (Polyrhachis), *Verh. zool.-bot. Ges. Wien*, xxviii (1878), p. 657, ☿; *Forel* (Polyrhachis), *Jour. Bomb. N. H. Soc.* viii (1893), p. 17, ☿.

☿. Jet-black, shining, the mandibles finely longitudinally striate, opaque, the extreme bases of the antennæ and the femora and tibiæ of the legs blood-red; head, thorax and abdomen covered with fairly plentiful erect pale hairs, the front of the prothorax and sides of the pro-, meso- and metathorax with a fine, very short, sericeous recumbent pubescence. Head from the front nearly square, the sides not very convex, the vertex broad and rounded, the truncation of the eyes posteriorly oblique; the clypeus convex, tectiform, rounded anteriorly. Thorax strongly arched, narrowed posteriorly, convex on the margined sides, the pro-, meso- and basal portion of the metanotum each broader than long; pronotal spines long, acute, directed almost straight forward, basal portion of metanotum bounded posteriorly by a faint transverse carina, apical portion of metanotum very slightly concave; legs comparatively stout, tibiæ smooth, not spinose. Node of pedicel biconvex, the upper lateral angles surmounted by two acute spines, beneath the base of which on the outside is a short blunt tooth; abdomen oval, slightly depressed, pointed at apex.

♀. Resembles the ☿, but the pronotal spines are shorter and the pedicel spines are formed into laminate projections bituberculate at apex.

♂. Eyes not truncate. Node of pedicel rounded.

Length, ☿ 6–7; ♀ 7; ♂ 5·5 mm.

Hab. India, Kanara (*Wroughton*), Travancore (*Ferguson*); Burma; Tenasserim (*Bingham*).

Genus POLYRHACHIS.

Formica, pt., *Fabr. Syst. Ent.* 1775, p. 394.

Polyrhachis, *Swains. & Shuck. Hist. & Nat. Arrangt. of Ins., Lardner's Cyclop.* (p. 172, no desc.) (1840); *Smith, Jour. Linn. Soc.* ii (1858), p. 58.

Type, *P. bihamata*, Drury, from the Malay Peninsula.

Range. Both hemispheres.

☿. Resembles *Camponotus*; but there is little or no difference in the size and form of workers. Head more or less orbicular, maxillary palpi 6-, labial palpi 4-jointed, the basal joint of the maxillary palpi about half the length of the 2nd joint. Thorax and node of the pedicel more or less armed with spines or teeth, or with certain points distinctly angular, rarely wholly unarmed. Abdomen short, the basal segment generally covering more than half of the total length of the abdomen.

♀. Similar to the ☿. Thorax subovate and more massive. As a rule the armature is similar, but the thoracic and pedicel spines or teeth are generally shorter and thicker. Fore wing with one marginal and two cubital cells, the 2nd cubital cell generally reaching the outer margin of the wing. Abdomen larger than in the ☿, with the basal segment proportionately not so long.

♂. Similar to the ♀, but very much smaller, with a narrower abdomen, and in all the species of which the males are known with the thorax and node of the pedicel unarmed.

The species of *Polyrhachis* are on the whole arboreal ants, making their nests either between the leaves or in the hollows of trees and bamboos. A few—*P. lævissima*, Smith, for instance—nest in the ground; others like *P. armata*, le Guillou, occasionally make their nests inside human habitations. The nests of *Polyrhachis* are of a silky cobwebby material, which, when the nests are made among leaves, is used to attach leaf to leaf; in ground-building species it is used to line the galleries. *P. armata*, *P. dives*, and many others construct the whole nest of this material.

Key to the Species.

A. Thorax and pedicel armed with spines or teeth.
- *a*. Thorax more or less rounded above, the sides not margined along their whole length.
  - a'. Pro- and mesonotum with a spine on each side.
    - a^{2}. Spines on node of pedicel parallel for a part of their length from base.
      - a^{3}. Pronotal spines pointing outwards, and curved laterally backwards, forming hooks .... *P. bihamata*, p. 386.
      - b^{3}. Pronotal spines pointing outwards, slightly bent downwards, not forming hooks .... *P. bellicosa*, p. 387.
    - b^{2}. Spines on node of pedicel not parallel, divergent from base .... *P. ypsilon*, p. 387.
  - b'. Pro- and metanotum with a spine on each side, mesonotum unarmed.
    - a^{2}. Pubescence soft, erect and abundant.
      - a^{3}. Spines on node of pedicel forming hooks .... *P. furcata*, p. 388.
      - b^{3}. Spines on node of pedicel not forming hooks.
        - a^{4}. Head not punctured, smooth, shining. *P. gracilior*, p. 388.
        - b^{4}. Head coarsely punctured posteriorly. *P. phipsoni*, p. 389.
    - b^{2}. Pubescence short, silky and recumbent, or sparse and erect, or entirely absent.
      - a^{3}. Metanotal spines forming hooks.
        - a^{4}. Abdomen with dense golden pile .. *P. rupicapra*, p. 389.
        - b^{4}. Abdomen without pile or pubescence.
          - a^{5}. Thorax finely punctured, head and abdomen opaque .... *P. hodgsoni*, p. 390.
          - b^{5}. Thorax coarsely punctured, head and abdomen shining .... *P. arachne*, p. 390.

- b^3. Metanotal spines not forming hooks.
  - a^4. Basal portion of metanotum not margined laterally.
    - a^5. Pubescence sparse, almost entirely wanting.
      - a^6. Pedicel spines wide-spreading, shaped so as to encircle front of abdomen.
        - a^7. Head with a tubercle on each side behind the eyes ...... *P. tubericeps*, p. 391.
        - b^7. Head not tuberculate ...... *P. thompsoni*, p. 391.
      - b^6. Pedicel spines not so wide-spreading, not shaped so as to encircle the abdomen.
        - a^7. Head, thorax and abdomen shining metallic blue or purple .... *P. venus*, p. 392.
        - b^7. Head, thorax and abdomen black, the latter sometimes red.
          - a^8. Head, thorax and node of pedicel coarsely punctured.
            - a^9. Abdomen black; length 9–10·5 mm. .... *P. armata* (typical), [p. 393.
            - b^9. Abdomen ferruginous; length 5·7 mm. ...... *P. fortis*, p. 394.
          - b^8. Head, thorax and node of pedicel finely punctured.
            - a^9. Node of pedicel with 2 median vertical short acute spines between spines on upper lateral angles of node ...... *P. hauxwelli*, p. 394.
            - b^9. Node of pedicel without median spines ...... *P. simplex*, p. 394.
    - b^5. Pubescence dense, silky and recumbent.
      - a^6. Abdomen red .... *P. bicolor*, p. 395.
      - b^6. Abdomen black.
        - a^7. Pubescence bronzy yellow or golden.
          - a^8. Two small teeth between spines on upper lateral angles of node of pedicel. *P. dives*, p. 396.
          - b^8. Three small teeth between spines on upper lateral angles of node of pedicel. *P. affinis*, p. 396.
        - b^7. Pubescence silvery .... *P. tibialis*, p. 396.
  - b^4. Basal portion of metanotum distinctly margined laterally.
    - a^5. Pronotal and metanotal spines subequal.
      - a^6. Length 7–9 mm.
        - a^7. Abdomen steel-blue ...... *P. chalybea*, p. 397.
        - b^7. Abdomen red .... *P. abdominalis*, [p. 397.
      - b^6. Length 6–7 mm.; abdomen bronze-green .... *P. ædipus*, p. 398.

b^5. Metanotal spines nearly twice the length of the pronotal spines.
a^6. Mesonotum concave; tibiæ with spines on the inner margin . . *P. mutata*, p. 399.
b^6. Mesonotum convex; tibiæ without spines on the inner margin. *P. binghami*, p. 399.
c'. Pronotum with a short tooth; metanotum with a spine on each side; mesonotum unarmed.
a^2. Abdomen not depressed, very convex above.
a^3. Length 6–7 mm.; abdomen red . . . . *P. levigata*, p. 400.
b^3. Length 4–5 mm.; abdomen black . . *P. ceylonensis*, p. 400.
b^2. Abdomen strongly depressed, only very slightly convex above . . . . *P. wroughtoni*, [p. 401.
d'. Pronotum with a short tooth on each side; mesonotum and metanotum unarmed . . *P. lævissima*, p. 402.
b. Thorax more or less flat above, the sides margined along their whole length.
a'. Pronotum, mesonotum and metanotum with a spine on each side . . . . *P. craddocki*, p. 403.
b'. Pronotum with a spine, mesonotum and metanotum with a triangular lamina on each side . . . . *P. horni*, p. 403.
c'. Pronotum with a long spine; mesonotum unarmed; metanotum with a tooth or tubercle on each side.
a^2. Node of pedicel with 2 long spines on upper angles, and two short lateral spines or teeth on sides.
a^3. The lateral spines or teeth truncate or bimucronate at apex.
a^4. Pubescence very dense . . . . *P. proxima*, p. 405.
b^4. Pubescence sparse . . . . *P. intermedia*, [p. 405.
b^3. The lateral spines or teeth pointed, not truncate nor bimucronate at apex.
a^4. Pubescence very dense . . . . *P. mayri*, p. 404.
b^4. Pubescence absent or very sparse.
a^5. Antennal carinæ long, divergent posteriorly . . . . *P. striata*, p. 405.
b^5. Antennal carinæ short, not divergent posteriorly.
a^6. Legs thickly covered with long erect hairs . . . . *P. hamulata*, p. 406.
b^6. Legs hairless, smooth . . . . *P. yerburyi*, p. 406.
b^2. Node of pedicel armed with 4 short subequal spines.
a^3. Length 9–10 mm. . . . . *P. striatorugosa*, [p. 407.
b^3. Length 5–6 mm. . . . . *P. convexa*, p. 408.
d'. Pronotum with a short spine or tooth; mesonotum unarmed; metanotum with a lamina, spine or tooth on each side.
a^2. Metanotum with backward pointing laminate spines on each side, with the apices curved inwards, shaped like a pair of callipers . . . . *P. selene*, p. 408.

b^2. Metanotum with vertical or obliquely sloped teeth or spines.
  a^3. Node of pedicel with two long spines on upper lateral angles and two short obtuse teeth between them .... *P. jerdoni*, p. 409.
  b^3. Node of the pedicel quadridentate or quadrispinous, the spines typically subequal .... *P. punctillata*, [p. 409.
  c^3. Node of pedicel trispinous.
    a^4. Antennal carinæ distinctly divergent posteriorly .... *P. thrinax*, p. 410.
    b^4. Antennal carinæ not divergent posteriorly .... *P. frauenfeldi*, [p. 411.
c'. Pronotum and mesonotum unarmed; metanotum with a spine on each side.
  a^2. Metanotal spines broad, triangular, pointing backwards.
    a^3. Head and thorax punctured, not striate. *P. clypeata*, p. 411.
    b^3. Head and thorax striate .... *P. rastrata*, p. 412.
  b^2. Metanotal spines vertical, very small .. *P. halidayi*, p. 413.
B. Thorax wholly unarmed; pedicel with four subequal spines or teeth .... *P. rastellata*, p. 414.

451. **Polyrhachis bihamata**, *Drury* (Formica), *Ill. Exot. Ins.* ii (1773), p. 73, pl. 38, figs. 7 & 8; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 21, ☿.

☿. Rufous brown, the head, apex of the femora, the tibiæ and tarsi, and apices of the thoracic and pedicel spines black, the apical half of the abdomen more or less fuscous, the whole insect covered with a fine sericeous pile mixed with scattered erect hairs;

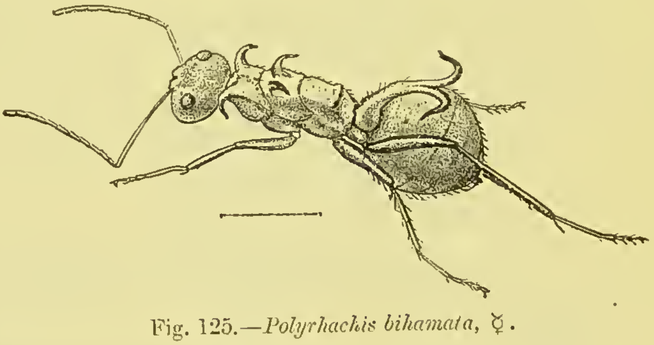

Fig. 125.—*Polyrhachis bihamata*, ☿.

pronotal spines pointing obliquely forward and bent outwards and backwards; mesonotal spines erect, their points directed backwards. Node of pedicel columnar; above, it rises into two long spines, parallel for a part of their length from base, then turned outwards and downwards.

Length, ☿ 10–12 mm.

Hab. Lower Burma, Pegu Yoma (*Allan*); Tenasserim (*Bingham*), extending into the Malay Peninsula, Sumatra, Borneo, Java.

I once found a nest of this species in the Thaungyin valley. It was of silky yellowish-brown material, placed close to the ground in the centre of a clump of bamboos, and measured about a foot in diameter.

452. **Polyrhachis bellicosa**, *Smith, Jour. Linn. Soc.* iii (1859), p. 142, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 21, ☿.

☿. Resembles *P. bihamata*, Drury, but is a smaller, slighter insect, and the spines of the thorax and pedicel are different in shape. Head, apices of the femora, the tibiæ and tarsi, the apices of the thoracic and pedicel spines and the abdomen black; pubescence as in *P. bihamata*, but not quite so dense, and entirely destitute of erect hairs. Pronotal spines short, pointing outwards and downwards; mesonotal spines curved and sloping obliquely back. Node of the pedicel columnar, spines very much shorter proportionately than in *P. bihamata*, and curved backwards, downwards and slightly outwards.

Length, ☿ 8–9 mm.

Hab. I picked up a solitary specimen in the Mergui Forest Experimental Gardens, and Dr. Forel has received this species from Singapore. It occurs in Sumatra, Borneo and Java.

453. **Polyrhachis ypsilon**, *Emery, Ann. Mus. Civ. Gen.* xxiv (1886), p. 239, ☿.

☿. Closely resembling *P. bihamata*, Drury, but it is larger, with the thoracic and pedicel spines somewhat differently shaped, and it differs also in colour and pubescence. Black, with the node of the pedicel more or less reddish yellow; pubescence fairly dense, recumbent and of a greyish, in some specimens of a rich golden yellow; head, thorax and abdomen very finely rugulose beneath the pubescence. Head a little longer and more oval than in *P. bihamata*, with the clypeus broadly vertically carinate down the middle (in *P. bihamata* it is convex and not carinate). Pronotal and mesonotal spines similar to those in *bihamata*, but much thicker, and their apices instead of being bent backwards are turned a little outwards; legs as in *bihamata*, thickly spinose. Node of pedicel columnar, with two long hooked spines curved outwards and divergent from base; abdomen short, globose.

Fig. 126.—*Polyrhachis ypsilon.* Node of pedicel of ☿.

Length, ☿ 10·5–11 mm.

Hab. Ceylon (*Forel*); Singapore; Sumatra; Borneo.

Dr. Forel received this species from Ceylon; I have only seen Sumatran specimens, from one of which the above description is taken.

454. **Polyrhachis furcata**, *Smith, Cat.* vi (1858), p. 64, pl. 4, fig. 20, ☿ ; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 25 & 33, ☿.

☿. Black, the apical half of the flagellum of the antennæ and the legs and abdomen castaneous ; head and abdomen polished and shining ; thorax and node of the pedicel very coarsely punctured. Thoracic and pedicel spines slender ; pronotal spines pointing

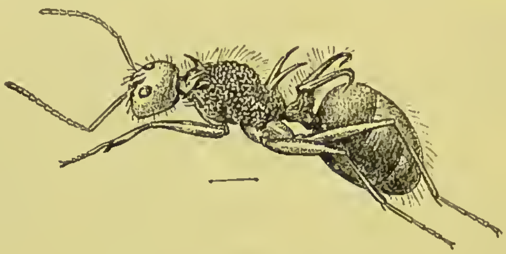

Fig. 127.—*Polyrhachis furcata*, ☿.

forward and outward and curved slightly downward ; metanotal spines much longer than the pronotal spines, erect and slightly curved backward. Node of pedicel columnar, with two long spines rising above it like the lateral branches of a Y, their apical half curved backward, downward and slightly outward.

Length, ☿ 4·5–5·5 mm.

Hab. Assam (*Smythies*) ; Burma ; Tenasserim (*Fea*, *Hodgson*, *Bingham*).

The colour is variable in this species ; some have the legs nearly black, and the majority of specimens have the abdomen jet-black. Var. *tenella*, Forel, has the spines on the node of the pedicel enormously long.

455. **Polyrhachis gracilior**, *Forel.*

Polyrachis furcata, *race* gracilior, *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 25 & 33, ☿.

☿. Resembles *P. furcata*, Smith, but is much smaller and the thoracic and pedicel spines are different. Rufous brown ; head black, scape of the antennæ for the greater part of its length from base fuscous black ; head and abdomen highly polished, shining ; thorax and node of pedicel coarsely punctured, but not so coarsely as in *P. furcata*. Pronotal spines proportionately much shorter than in the above species ; metanotal spines similar. Node of the pedicel not columnar, broader than long, with two long slender spines rising from the upper lateral angles and curved so as to embrace the abdomen.

Length, ☿ 4–4·5 mm.

Hab. Travancore (*Ferguson*) ; Assam (*Long*).

Dr. Forel considers this species simply a race of *P. furcata*, but the shape of the spines on the pedicel, which is constant, serves to distinguish it at a glance.

456. **Polyrhachis phipsoni,** *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 399, ☿.

"☿. *Length* 4·8 mm. Very close to *P. furcata*, Smith, from which it differs by the following characters:—Head longer than broad; scape more slender. Clypeus not carinate; a raised margin in the place and position of the frontal sulcus. Thorax less convex; spines of the metanotum shorter than in typical *P. furcata*, but longer than in *P. gracilior*. The node or column of the pedicel is lower and much thicker (nearly as long as broad), with the upper surface inclined from front to back and terminated in front by a somewhat acute protuberance. The spines of the columnar node are nearly horizontal, elongate, slightly encircling the abdomen (as in *P. gracilior*), but never recurved at apex. A longitudinal lobe under the pedicel (there is a tooth in *P. furcata*). Sculpture very coarsely reticulate as in *P. furcata*; but this sculpture extends on to the posterior half of the head, which in *P. furcata* is smooth and shining. Front of the head somewhat smooth, sparsely punctured. Abdomen smooth and shining. Pilosity and pubescence as in *P. furcata*, but the pubescence on the abdomen is more abundant, on the thorax more sparse. Of a dark red. Scape, abdomen and the apex of the spines blackish; tibiæ and tarsi brownish." (*Forel.*)

Hab. I procured this species myself in the Yè valley, Tenasserim, but unfortunately have no specimens to refer to now, so I reproduce Dr. Forel's description.

457. **Polyrhachis rupicapra,** *Roger, Berl. ent. Zeit.* vii (1863), p. 154, ☿ ♀; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 25, ☿.

"☿. *Length* 8 mm. Black, opaque; the head has a very sparse, the thorax and node of pedicel a more abundant fine yellowish recumbent pubescence; the abdomen, however, is densely clad with a recumbent golden pile. The antennal carinæ are moderately wide apart, in front nearly as wide apart as posteriorly. The clypeus is arched anteriorly, in the middle almost triangularly incised, and toothed on each side near the emargination, very shortly carinate posteriorly below the frontal area. The scape of the antennæ is stout, somewhat thickened towards the apex. Mandibles longitudinally striate, with scattered shallow punctures. The head is coarsely intricately rugose, and in the intermediate spaces somewhat granulate; the clypeus and the frontal area are much more finely rugose. The thorax above is slightly convex and rounded on the sides, very like what it is in *P. dives*. The pronotum is furnished with two spines in front, directed forwards and outwards, much longer than in *dives*, and they are slightly curved. The two metanotal spines are longer and thicker than the pronotal spines, divergent *with the apical portion curved outwards* in form, very like the horns of the chamois. Thorax coarsely irregularly rugose. *Node of pedicel with two long slender spines which are disposed in lunate fashion clasping the base of the abdomen*; between

them in the middle are *placed two short erect teeth.* Underside of the first tarsal joint with golden pubescence; claws reddish.

"♀. *Length* 9 mm. Similar to the ☿, but the pronotal spines are like triangular short teeth; the mesonotum in front is finely rugose and in the middle, like the scutellum, studded with neat rounded punctures; the spines of the metanotum are shorter, stouter, with the apex only a little bent outwards. Also the spines on the node of the pedicel are somewhat shorter than in the ☿. The wings are brownish, the nervures brown." (*Roger.*)

Hab. Ceylon. Unknown to me.

458. **Polyrhachis hodgsoni,** *Forel, Ann. Soc. Ent. Belge*, xlvi (1902), p. 289, ☿.

☿. Resembles *P. arachne*, Emery, in the shape and disposition of the metanotal and pedicel spines, but differs from that species considerably in sculpture and in the pronotal spines being stouter and more erect. Black; the head and thorax very finely and delicately punctured, rugulose, opaque; abdomen smooth, not shining, with a thin covering of very fine silky yellowish pile, and on the apical segments a few short erect hairs. Pronotal spines stout, pointing slightly forward, upward and outward; metanotal and pedicel spines as in *P. arachne.* There is a distinct transverse gibbosity on the thorax at the meso-metanotal suture, and the abdomen is longer and more massive than in the above-named species.

Length, ☿ 6–7 mm.

Hab. Tenasserim, Moulmein, Papun.

I found this species in the forests on the Yunzalin river, near Papun, fairly common, nesting like *P. arachne* in the hollow joints of bamboos. In Mr. Wroughton's collection there are specimens collected by Mr. Hodgson of the Forest Department, labelled Moulmein.

459. **Polyrhachis arachne,** *Emery, Ann. Soc. Ent. Belge,* xl (1896), p. 249, ☿.

☿. Jet-black, the head and abdomen shining; the head and

Fig. 128.—*Polyrhachis arachne*, ☿.

node of the pedicel finely rugulose; thorax above rather coarsely,

on the sides finely and delicately punctured; the apices of the thoracic and pedicel spines, and the legs and abdomen smooth and highly polished; pubescence and hairs entirely wanting. Pronotal spines shorter than the metanotal spines, pointing forward, outward and curved slightly downward; metanotal spines stout, erect, their apical half curved outward and downward, resembling chamois horns. Node of pedicel biconvex, with two moderately long spines rising from the lateral angles above and pointing backward, curved to the shape of the abdomen.

Length, ☿ 8–9 mm.

Hab. Upper Burma, the Ruby Mines (*Bingham*), and Shan States, at 4000 feet (*Thompson*); Tenasserim, Karen Hills north of Papun at 5000 feet (*Bingham*); Java. Nests in the joints of bamboos.

460. **Polyrhachis tubericeps**, *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 26 & 33. ☿.

☿. Closely resembles *P. simplex*, Mayr, but can be readily distinguished by the shape of the head. Dull black, head, thorax and node of the pedicel somewhat coarsely and closely punctured; antennæ, legs and abdomen opaque, finely granulate; the extreme apex of the thoracic and pedicel spines smooth and shining, pubescence entirely wanting. Head broadly oval, rounded posteriorly, the tubercle behind the eyes on each side very distinct; clypeus convex, broadly but not very distinctly longitudinally carinate, its anterior margin nearly transverse, with two minute median projections; thorax slightly depressed; pronotal spines short, pointing forward and outward; metanotal spines erect, slightly curved outward at their extreme points; legs stout, tibiæ without hairs or spines. Node of pedicel thick, with a moderately long, stout spine at its lateral angles, curved backwards and embracing the abdomen, and with two vertical acute short teeth between them; abdomen only slightly convex above.

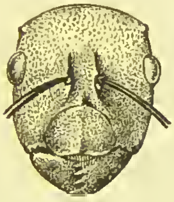

Fig. 129. *Polyhachis tubericeps*, ☿.

Length, ☿ 7–8 mm.

Hab. Bengal, Barrackpore; North-West Provinces (*Rothney*).

But for the tuberculate head this species is almost identical with some of the larger varieties of *P. simplex*, Mayr.

461. **Polyrhachis thompsoni**, sp. nov.

Black, opaque; head and thorax moderately coarsely, abdomen very finely rugulosely granulate; pilosity and pubescence entirely wanting, with the exception of a very few erect yellowish hairs at the apex of the abdomen. Head nearly oval, a little broader posteriorly than in front; clypeus convex, its anterior margin slightly advanced in the middle, with the apex medially sub-

truncate; antennal carinæ of moderate length, as broad posteriorly as in front. Thorax seen from the side strongly arched, very convex above; pro-mesonotal suture very distinct, smooth and shining, meso-metanotal suture indicated; pronotal spines short, thick at base, directed divergently forward with a slight downward bend; metanotal spines massive, long, acute, pointing obliquely back; legs of moderate length, entirely destitute of spines or erect hairs. Node of pedicel biconvex, armed with two long curved spines pointing backwards, and shaped so as to encircle the front of the abdomen, and between them in the middle on the upper margin of the pedicel-node three very short obtuse teeth disposed in a triangle, the apex of the triangle directed forward as in *P. affinis*; abdomen short, globose.

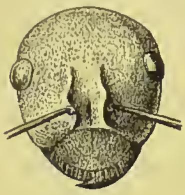

Fig. 130. *Polyrhachis thompsoni*, ☿.

Length, 6 mm.

Hab. Tenasserim, Ataran valley (*Bingham*); Upper Burma, the Shan States (*Thompson*).

Rare; described from two specimens in my collection.

462. **Polyrhachis venus**, *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 23 & 31, ☿.

☿. Brilliant dark metallic blue; the abdomen particularly bright, polished and shining; the head and thorax above very minutely and finely shagreened, pubescence entirely wanting. Head very broadly oval, the sides almost straight; clypeus high and broad, tectiform, its anterior margin nearly transverse with a medially impressed spot. Pronotal spines very little more than half the length of the metanotal spines, pointing forwards and outwards; metanotal spines very thick at base, long, acute and oblique; legs long, robust; the tibiæ without spines or hairs. Node of pedicel comparatively low, very convex in front, flattish posteriorly, bearing a thin spine at its lateral angles, pointing upwards and slightly backwards; these spines not so long as those on the metanotum; abdomen rather massive, very convex above.

Fig. 131. *Polyrhachis venus*, ☿.

Length, ☿ 9–10·5 mm.

Hab. Tenasserim, the Ataran valley; the Thaungyin valley (*Hodgson, Bingham*).

The abdomen of this very beautiful species has, as Dr. Forel remarks, the metallic glint of certain beetles of the genus *Meloe*. I noticed that these ants habitually carried their conspicuous shining abdomen depressed and in a way tucked up partially under their thorax. This they were enabled to do owing to the

length of their legs, which in walking raised them well above the ground. On being touched they emitted a strong pleasant smell, like that of the tuberose.

463. **Polyrhachis armata**, *Le Guill.* (Formica) *Ann. Soc. Ent. Fr.* x (1841), p. 313, ♂; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 26 & 34, ☿.
Polyrachis defensus et pandarus, *Smith, Jour. Linn. Soc.* ii (1857), pp. 59 & 62, ☿ ☿.

☿. Black; head, thorax and node of pedicel coarsely punctured; legs and abdomen opaque, granulate; pubescence entirely wanting. Head oval, narrowed posteriorly; clypeus vertically subcarinate; median lobe broad but short, its anterior margin widely emarginate. Thorax higher than the head, gibbous; pronotal, metanotal and

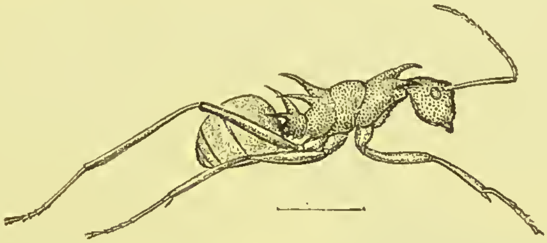

Fig. 132.—*Polyrhachis armata*, ☿.

pedicel spines stout, moderately long, subequal, pronotal spines pointing divergently forwards, metanotal and pedicel spines divergently backwards; legs long, robust, tibiæ without spines or hairs. Node of pedicel cubical; the anterior lateral angles with a short vertical tooth, the posterior angles spined; abdomen globose.

♀. Similar, the thorax very massive; the mesonotum and scutellum gibbous; the thoracic and pedicel spines much thicker and somewhat shorter.

Length, ☿ 9–10·5; ♀ 11·5 mm.

Hab. Assam, and throughout the whole of Burma and Tenasserim; extending to Borneo, Java and the Philippines.

P. defensus, Smith = *P. armata* var. *minor*, Forel (Jour. As. Soc. Beng. lv (1886), p. 241). Both forms occur in Burma and are common. In sculpture and form of the thoracic and pedicel spines they are exactly alike, but *P. defensus* is invariably smaller (length 7–8 mm.), and as invariably has the abdomen red. I am a little in doubt as to whether *P. defensus* should not be considered a good species, for the two forms never intermingle or occur in the same nest. I once found a huge nest of the larger variety built inside a Forest Department Inspection bungalow. It extended across a window and a portion of the outer wall. The nest measured 4′-3″ × 2′-7″ × 5¼″.

464. **Polyrhachis fortis**, *Emery, Rev. Suisse Zool.* i (1893), p. 228, pl. viii, fig. 5, ☿; *Forel, Jour. Bomb. N. H. Soc.* ix (1895), p. 456, ☿.

"☿. Black; abdomen ferruginous, opaque, densely rugose-punctate, not pubescent; head ovate, clypeus convex, anteriorly in the middle obtusely truncate; thorax massive, not margined, with four spines, the metanotal spines strong and thick, elongate, sub-erect; node of pedicel with arcuate acute spines. Length 5·7 mm.; width of head 1·4, of thorax 1 mm.; length of pronotal spines 0·6, of metanotal spines 1 mm.; distance between the apices of the nodal spines 2 mm.

"Upper Burma, one specimen." (*Emery.*)

Unknown to me, but apparently very similar to *P. armata*, var. *defensus*, Smith.

465. **Polyrhachis hauxwelli**, sp. nov.

☿. Black; head and thorax finely punctured, the punctures rather larger and coarser on the latter; abdomen finely, minutely rugulose, opaque; pubescence almost wanting, confined to a few short erect hairs on the front of the head and the apical segments of the abdomen. Head oval, clypeus not very convex, sublobed, with the anterior margin rounded, and a faint medial vertical carina; antennal carinæ far apart, not divergent. Thorax seen from the side moderately arched, very rounded and convex above; pro-mesonotal suture indicated, meso-metanotal suture completely obsolete; pronotal spines very short, acute, planted low down on the anterior lateral angles of the pronotum; metanotal spines much longer, suberect, sloping backwards and with the extreme apex bent laterally outwards; legs stout, the tibiæ with a row of short spines beneath. Node of pedicel low, biconvex, much more strongly convex posteriorly than in front, armed at the upper lateral angles with two thick, rather short spines which are directed backwards and curved to the shape of the base of the abdomen; between the two spines on the upper margin of the node in the middle are two short acute upright spines; abdomen broadly oval.

Fig. 133.—*Polyrhachis hauxwelli*, ☿.

Length, ☿ 4–5 mm.

Hab. Tenasserim, the Taoo plateau, 4000 feet (*Hauxwell*).

466. **Polyrhachis simplex**, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 682, ♀; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 26 & 34, ☿ ♀.

Polyrhachis spiniger, *Mayr, Verh. zool.-bot. Ges. Wien*, xxviii (1879), p. 653, ☿ ♂.

☿. Black; head and thorax finely punctured, granulate, abdomen

opaque; pubescence almost entirely absent except a few scattered erect hairs on the front of the head and on the apical segments of the abdomen. Head broadly oval; clypeus with a distinct medial vertical carina, and briefly lobed, the anterior margin incised in the middle; antennal carinæ wide apart, not divergent. Thorax narrower than the head, compressed posteriorly, pronotum and mesonotum longer than broad; pronotal spines very short and

Fig. 134.—*Polyrhachis simplex*, ☿.

thick, directed obliquely outwards; metanotal spines erect, slightly divergent, the apex slightly bent outwards; legs stout, tibiæ without hairs or spines, except towards the apex where there are three or four on the underside. Node of pedicel broader than long, biconvex, with two spines curved to the shape of the abdomen on the upper lateral angles, and to obtuse points or teeth in the middle between them; abdomen short, very convex above, globose.

♀. Very similar; the mesonotum and scutellum rather coarsely punctured, pronotal spines very short, metanotal and pedicel spines shorter than in the ☿ and more massive; wings hyaline, with a slight yellowish tint.

♂. Abdomen shining, the head and thorax opaque, the base of the metanotum with a slight longitudinally impressed line, thorax and node of the pedicel unarmed. Wings subhyaline.

Length, ☿ 4·5–7; ♀ 8; ♂ 7 mm.

Hab. Found throughout our limits; nearly the most common species of the genus.

467. **Polyrhachis bicolor**, *Smith*, *Cat.* vi (1858), p. 65, ♀; *Forel*, *Jour. Bomb. N. H. Soc.* viii (1893), p. 26, ☿.

☿. Head, thorax and node of pedicel black; antennæ, mandibles, legs and abdomen light red; the whole insect covered with a fine silky yellowish-white recumbent pubescence, fairly long and dense, hiding the sculpture. Head broader above than below, the cheeks only slightly convex; eyes round, very prominent. Thorax very convex in front; pronotal and metanotal spines short, slender and very acute; legs long and slender, covered with soft, very fine, long erect hairs. Node of the pedicel longer than broad at base, surmounted by two slender erect spines at its lateral angles, which are longer than either the pro- or metanotal spines; abdomen very convex above.

♀. Very much larger than the ☿, not so densely pubescent; thoracic and pedicel spines shorter, thicker; abdomen proportionately more massive.

Length, ☿ 5–6; ♀ 8–9 mm.

Hab. Bengal (*Rothney*); Burma (*Bingham*); Philippines; Molucca.

The ♀ occasionally has the antennæ and legs black.

468. **Polyrhachis dives**, *Smith, Jour. Linn. Soc.* ii (1857), p. 64, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 27 & 34, ☿.

☿. Black, with a dense, bronzy, golden recumbent pile, sparse on the head, but fairly dense on the thorax and abdomen, hiding the sculpture. Head finely rugulose, short and broad, as broad posteriorly as in front, the cheeks convex; the clypeus medially vertically carinate, sublobed, the anterior border of the lobe emarginate. Thorax very convex and rounded; pronotal spines pointing forward, outward and slightly bent downward; metanotal spines erect, divergent, their apices slightly bent outward; legs slender, tibiæ with a row of short spines on the underside. Node of pedicel high, flat and truncate in front, convex posteriorly, surmounted at the lateral angles by two wide-spreading spines curved to the shape of the abdomen, and with two medial short obtuse teeth; abdomen short and broad.

Length, ☿ 6–7 mm.

Hab. Burma (*Brit. Mus.*); Tenasserim (*Bingham*); Ceylon (*Yerbury*); extending to China, Siam, the Malayan Peninsula, and down to the Philippines and Molucca.

469. **Polyrhachis affinis**, *Smith, Cat.* vi (1858), p. 63; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 27, ☿.

Polyrhachis vicina, *Roger, Verz. Form. Gatt. u. Art.* (*Berl. ent. Zeit.* vii, 1863), p. 7, ☿.

☿. Closely resembles *P. dives*, Smith, but is constantly smaller: the thorax is not so convex, and the pedicel spines not so wide-spreading, with three (not two) short obtuse teeth between them, placed more or less triangularly, one in front, two posteriorly; the legs are also stouter in proportion, with the tibiæ less spinose beneath.

Length, ☿ 4–5 mm.

Hab. Burma; Tenasserim (*Bingham*).

P. dives and this closely allied species are both very common throughout Burma and Northern Tenasserim, but the latter apparently does not go further south. Both build small globular nests of cobwebby material in low bushes, but the nests of *P. affinis* are much smaller, and the colonies less populous.

470. **Polyrhachis tibialis**, *Smith, Cat.* vi (1858), p. 63, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 27 & 35, ☿.

Polyrachis acasta, *Smith, Jour. Linn. Soc.* v (1861), p. 100, pl. i, fig. 23.

Polyrhachis argenteus, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 682, ☿.
Polyrhachis caligata, *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 482, ☿.

☿. Black; the legs more or less castaneous red; the whole insect covered with a fine dense, recumbent, silky silvery pile, very brilliant and glittering in fresh specimens, and entirely hiding the sculpture. Head very convex in front and at the sides; clypeus tectiform, its anterior margin more or less rounded. Thorax convex, sometimes with the meso- and pronotum gibbous; pronotal spines short, acute, pointing forwards; metanotal spines straight, pointing backwards, and with a more or less distinct ridge between them across the metanotum; legs long and slender, the tibiæ smooth. Node of pedicel high, biconvex, the middle slightly arched, bearing two short teeth, the lateral angles spined, the spines wide-spreading, curved to the shape of the abdomen.

♀. Similar, more massive; the thoracic and pedicel spines shorter and thicker, the pronotal spines being reduced to mere acute tubercles; abdomen very massive; wings brown, nervures darker.

Length, ☿ 4–5·5; ♀ 6·5 mm.

Hab. India, Kanara (*Wroughton*), Bengal (*Rothney*); Ceylon (*Yerbury*, *Green*): Burma; Tenasserim (*Bingham*); extending to the Malayan subregion.

The convexity of the thorax varies very much in this species, and cannot be relied on as separating *tibialis* from *acasta*.

471. **Polyrhachis chalybea,** *Smith, Jour. Linn. Soc.* ii (1857), p. 61, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 23, ☿.

☿. Head, thorax and node of pedicel black, legs and abdomen brilliant metallic purple; head, pro- and mesothorax finely rugulose, opaque, metathorax and node of pedicel polished, shining; abdomen smooth, brilliant and glittering. Head oval, constricted posteriorly. Thorax elongate; pro- and mesothorax of about equal width; the mesonotum circular, very slightly convex above; pronotal spines slender, acute, suberect, pointing slightly forwards; metathorax laterally strongly compressed, above concave, the sides vertical; the metanotal spines erect, nearly vertical, with very broad bases; legs stout, elongate; tibiæ minutely and sparsely spinose beneath. Node of the pedicel cubical, flat and truncate anteriorly, the posterior lateral angles with stout spines erect, slightly curved downward; abdomen short, very convex.

Length, ☿ 9–10 mm.

Hab. Mergui and southwards in Tenasserim (*Bingham*); Malacca; Borneo.

472. **Polyrhachis abdominalis,** *Smith, Cat.* vi (1858), p. 63, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 24, ☿.
Polyrachis phyllophilus, *Smith, Jour. Linn. Soc.* v (1861), p. 69, ☿.

? Polyrachis achilles, *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 24 & 32, ☿.

☿. Head, thorax, legs and node of pedicel black, abdomen red or fuscous red; pubescence wanting. Head, thorax and abdomen finely granulate, opaque. Head equally broad posteriorly and in front, the cheeks straight, not convex; clypeus convex, broad, with a broad but short lobe, the anterior margin of which is transverse. Thorax elongate, prothorax distinctly broader than the mesothorax; metathorax laterally compressed, but not so strongly as in *P. chalybea*, Smith; the mesonotum wide, convex; metanotum flat, in front of the spines between them slightly concave; pronotal spines slender, pointing forwards, metanotal spines broad and flat at base, slender above and pointing backwards; legs long, the tibiæ in some specimens slightly spinose, in others smooth. Node of pedicel much longer than wide, surmounted by two stout spines, which are slightly curved backwards; abdomen short, globose.

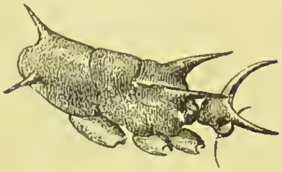

Fig. 135.—*Polyrhachis abdominalis*, ☿. Thorax.

Length, ☿ 8–9 mm.

Hab. Burma: Tenasserim (*Watson*, *Bingham*); Sumatra, extending to the Celebes.

I am doubtful whether *Polyrhachis achilles*, Forel, is anything more than a variety of *P. abdominalis*, Smith. The latter varies greatly in colour and in the thickness of the pedicel. *P. achilles* as described has a very short pedicel, and the tibiæ armed with only two or three spines on the inner margin. It is more robustly built, and the metanotum, according to Forel, is not laterally margined, otherwise it resembles *P. abdominalis*, Smith.

473. **Polyrhachis œdipus**, *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 22 & 31, ☿.

☿. Black, with a greenish-bronze tint; head, thorax and abdomen delicately shagreened and rugulose. Head broadly oval, the cheeks almost straight, clypeus convex, subcarinate, its anterior margin transverse. Thorax: pro- and mesothorax of the same width, the latter proportionately longer than in either *P. abdominalis* or *P. mutata*; pronotal spines stout, divergent, pointing forwards and outwards; metanotal spines slender, parallel, sloping backwards; legs elongate, slender, tibiæ compressed. Node of pedicel a little longer than wide, the spines rather short, widespreading and curved a little backwards; abdomen shining.

Length, ☿ barely 7 mm.

Hab. Ceylon (*Yerbury*, *Green*).

This species though resembling *P. mutata*, Smith, in form, is markedly smaller, with the thoracic and pedicel spines shorter and of a somewhat different shape.

474. **Polyrhachis mutata**, *Smith, Cat.* vi (1858), p. 64, pl. iv. figs. 12, 13, ☿.

Polyrachis mutata, *Smith, race* ajax, *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 24 & 32, ☿.

☿. Resembles *P. abdominalis*, Smith, but is more slenderly made, with the thorax much narrower and the thoracic and pedicel spines longer and more slender. Black, the abdomen from a brownish black or dark brown to dark red. Head, thorax and abdomen minutely rugulose granulate and opaque, the abdomen more minutely rugulose than the head and thorax; pilosity extremely sparse, confined to the extremities of the head and abdomen; pubescence extremely thin and minute, visible only in certain lights. Head with the posterior portion retreating and only lightly convex, the sides nearly straight; the eyes prominent, placed above the middle and rather forward; mandibles broad and powerful, armed with 5 teeth, finely striate towards the apical margin; clypeus nearly flat, very indistinctly subcarinate down the middle; antennæ long and slender, the scape extending more than half its own length beyond the top of the head. Thorax: the pro- and metanotal spines very long, almost horizontal and level with the back, divergent forward and backward respectively, the pronotal spines slightly curved downwards; pronotum between the spines flat; mesonotum slightly longitudinally concave, strongly margined; metanotum very narrow, concave from side to side and laterally margined, the margins in a line with the base of the metanotal spines; legs long, the tibiæ remarkably compressed and flattened, with a row of short but distinct spines on their internal margin. Pedicel thick, cylindrical, truncate posteriorly, and armed with two long divergent spines curved to the abdomen, not so slender as the metanotal spines; abdomen subglobose.

Fig. 136.—*Polyrhachis mutata*, ☿. Thorax.

Length, ☿ 7–8 mm.

Hab. Burma: Pegu Yoma, Maymyo, 3000 feet; Tenasserim (*Bingham*).

It is somewhat doubtfully that I join the race *ajax*, Forel, with *mutata*, Smith. Though originally collected by myself, I have now only one mutilated specimen of *P. ajax* named by Dr. Forel. This latter seems to me smaller, with a proportionately shorter, broader head and thorax than typical *P. mutata*, Smith, which I got plentifully at Maymyo.

475. **Polyrhachis binghami**, *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 25 & 33, ☿.

☿. Closely resembles *P. mutata*, Smith, especially the race *ajax*, Forel, but is a smaller and more stoutly built insect, entirely black and slightly more coarsely granulate. Head somewhat shorter and squarer; clypeus slightly more convex; pronotal spines shorter, stouter and straighter, not curved; mesonotum transversely convex,

not concave; metanotum shorter, the spines thicker at base and shorter. Pedicel shorter, but similar to the pedicel in *P. mutata*, but the spines are very much shorter, most noticeably so, and instead of passing round curved to the shape of the top of the abdomen, they embrace the abdomen somewhere about halfway up the anterior face of the 1st segment. Tibiæ of the legs not quite so compressed as in *P. mutata*, Smith, and entirely without spines on the inner margin.

Length, ☿ 5·5 mm.

Hab. Burma: Pegu Yoma (*Bingham*).

476. **Polyrhachis levigata**, *Smith, Jour. Linn. Soc.* ii (1857), p. 62, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 400, ☿.

☿. Black, the coxæ, base of the femora and abdomen red, apical half of the flagellum brownish red; head and abdomen smooth and shining, polished; thorax delicately punctured, subopaque. Thorax cylindrical, very convex above; pronotum transverse in front, without spines, but the lateral angles acute, subdentate; metanotum with the basal portion concave from right to left, the spines slender, acute, slightly divergent and sloped backward; legs rather long and stout, tibiæ smooth, without spines or hairs. Node of pedicel biconvex, with two proportionately stout spines, divergent and strongly curved backwards to the shape of the abdomen; abdomen globose.

Length, ☿ 5·6 mm.

Hab. Burma: Pegu Yoma (*Allan*); Tenasserim, Yè Valley (*Bingham*); Malacca.

A rare species. It is with some doubt that I follow Dr. Forel in uniting the above described ant with *P. levigata*, Smith. Smith says nothing of the abdomen being red, and states that *P. levigata* has the flagellum of the antennæ clavate, which the species from Burma and Tenasserim has not.

477. **Polyrhachis ceylonensis**, *Emery*.

Polyrachis hippomanes, *Smith, race* ceylonensis, *Emery, apud Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 22, ☿.

☿. Black; the flagellum of the antennæ, and the femora, tibiæ and tarsi of the legs reddish yellow, the mandibles and scape of the antennæ fuscous red. Head and thorax finely, abdomen minutely, reticulate-punctate and slightly shining; pubescence almost entirely wanting, a few scattered erect hairs occurring on the front of the head and apex of the abdomen. Head oval, a little broader posteriorly than in front; clypeus convex, with a median vertical carina, the anterior margin arched; antennal carinæ slightly divergent towards the vertex, moderately wide apart, with an impressed short vertical line between them. Thorax short and massive, convex above, the pro- and mesonotum broader than long; pronotum armed with a short outward-pointing tooth on each side; metanotum with two short erect stout spines at the posterior lateral angles of the basal portion; legs stout, tibiæ cylindrical, without erect

hairs or spines, and slightly attenuated towards the base. Node of pedicel somewhat flat in front, convex posteriorly, armed at the upper lateral angles with two strong, rather wide-spreading spines, that are curved backward; abdomen globose.

♀. Similar to the ☿ in colour; head and thorax reticulate-punctate, abdomen opaque; head shorter and much wider posteriorly than in the ☿; clypeus narrower, only subcarinate; pronotal spines thicker, triangular in shape, metanotal spines shorter and more horizontally directed backward; mesonotum nearly flat above, with an indistinct longitudinal sulcus down the middle and a short impressed line on either side near the base of the wings. Node of pedicel broad and flat, the spines shorter than in the ☿; the anterior portion of the abdomen with a deep overhanging margin, the abdomen above slightly convex, depressed.

Length, ☿ 4–5; ♀ 6 mm.

Hab. Ceylon (*Green*).

The ♀ differs more from the ☿ in this than in any other species of *Polyrhachis* known to me.

478. **Polyrhachis wroughtoni**, *Forel, Jour. Bomb. N. H. Soc.* viii (1894), p. 398, ☿; ix (1894), p. 457, ♀ ♂.

☿. Black; the antennæ, the tibiæ and tarsi of the anterior, and the femora, tibiæ and tarsi of the intermediate and posterior legs ochraceous, more or less shaded with fuscous, the femora of the anterior legs castaneous, the front of the abdomen reddish. Head, thorax and node of pedicel somewhat coarsely punctured, cribrate; abdomen finely granulate, opaque; with the exception of a few short erect pale hairs on the head anteriorly and on the apex of the abdomen beneath, pubescence entirely wanting; in certain lights a very thin recumbent pilosity is visible on the head, the sides of the thorax and abdomen. Head broader posteriorly than in front; clypeus very convex, with the anterior margin arched and bearing two short divergent teeth in the middle; antennal carinæ short, widely separated and slightly divergent posteriorly. Thorax short, massive, pronotum much broader than long; pro-mesonotal suture distinct, meso-metanotal suture obsolete; pronotum with the anterior margin transverse, undulate, the lateral angles armed with a short acute downward-bent tooth, directed obliquely outwards; metanotal spines acute, erect, very divergent; apical portion of metanotum flat, nearly concave; legs short, stout, the tibiæ smooth. Node of pedicel biconvex, broad, with two stout laterally spreading spines, curved to the shape of the abdomen; between them the upper margin of the node is arched and bears two minute erect teeth; abdomen depressed, very slightly convex above.

"♀. Mesonotum depressed, the pronotum armed with only two small triangular teeth. The spines on the metanotum are shorter than in the ☿ and directed more horizontally backward. Wings brown, a pale spot before the stigma. For the rest similar to the ☿.

"♂. No trace of teeth or spines. Metanotum rounded, the apical face much longer than the basal portion. Pedicel with a node broader than long. Finely reticulate-punctate and opaque or subopaque; abdomen finely reticulate and slightly shining. Pilosity almost entirely wanting. Pubescence fine, greyish, somewhat abundant all over without at the same time forming a distinct pile. Brownish black; the mouth-parts, apex of the antennæ, genital valves, trochanters, the joints, and sometimes the tibiæ and tarsi, reddish yellow." (*Forel.*)

Length, ☿ 4–4·5; ♀ 4·3–4·7; ♂ 5 mm.

Hab. Kanara (*Wroughton*).

479. **Polyrhachis lævissima**, *Smith, Cat.* vi (1858), p. 64, ☿, pl. 4, fig. 42; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 21 & 30, ☿.
Polyrhachis globularia, *Mayr, Tijds. v. Ent.* x (1867), p. 41, ☿.

☿. Black, the femora and tibiæ of the anterior, and the coxæ, femora and tibiæ of the intermediate and posterior legs blood-red. The whole insect smooth, highly polished and shining, almost without pubescence; a few short, pale, erect hairs on the face anteriorly and on the apex of the abdomen. Head subtriangular, much wider posteriorly than in front; clypeus convex, its anterior margin indistinctly slightly emarginate in the middle: antennal carinæ moderately wide apart, with a short longitudinal carina between them. Thorax viewed from the side very strongly arched, gibbous; lateral angles of the pronotum with a short tooth pointing outwards; pro-mesonotal suture distinct, meso-metanotal suture barely indicated; basal portion of metanotum passing into the apical portion with a smooth regular slope; legs moderately long, the tibiæ with extremely minute widely-spaced spines. Node of pedicel biconvex, with a moderately acute tooth at the upper lateral angles, between which the upper margin is strongly arched and emarginate in the middle; abdomen globose.

Fig. 137.—*Polyrhachis lævissima*, ☿. Thorax.

♀. Identical with the ☿ except in being larger and in the ordinary sexual difference between ♀ and ☿. Mesonotum gibbous in front, pronotum depressed, vertical. Wings dark brownish and subhyaline.

♂. Similar to the ♀, smaller; thorax shorter, proportionately deeper; mesonotum remarkably gibbous in front, head and abdomen very much smaller; wings as in the ♀ but a shade lighter in colour.

Length, ☿ 6–7; ♀ 8·5; ♂ 6 mm.

Hab. Bengal (*Rothney*); Orissa (*Taylor*); Assam (*Long*): Burma: Tenasserim (*Bingham*); Siam and down to Java.

Some specimens from Assam have the abdomen and legs of a reddish yellow, and the antennæ and front of the head reddish (var. *dichrous*, Forel).

480. **Polyrhachis craddocki**, sp. nov.

☿. Black, thorax and legs dark lake-brown; head and abdomen very smooth and shining; thorax delicately rugulose, opaque.

Fig. 138.—*Polyrhachis craddocki*, ☿. *a*. Node of pedicel.

Head very convex, much broader posteriorly than in front; clypeus convex, its anterior margin arched. Thorax compressed, the lateral margin deep, the sides vertical: pro-meso- and meso-metanotal sutures distinct; pronotal spines broad at base, pointing forwards and outwards, mesonotal spines nearly vertical, pointing slightly outwards; metanotal spines short, blunt, parallel, pointing obliquely backwards; mesonotum and basal portion of metanotum transversely concave; legs comparatively long, femora and tibiæ compressed, the tibiæ not spinous underneath. Node of pedicel columnar, very highly raised, surmounted by two cylindrical spines which rise vertically and are close together and parallel for three-fourths of their length from base, the apical fourth bent outwards and slightly backwards in the form of a hook; abdomen short and round, very convex above.

Fig. 139.—*Polyrhachis lamellidens*, ☿. Node of pedicel.

Length, ☿ 5·5–6·5 mm.

Hab. Upper Burma, the trans-Salween Shan States (*Craddock*).

This very distinct species is close to *P. lamellidens*, Smith, from China and Japan, but differs in the shape of its spines. In Smith's species the pronotal spines are curved downwards, the apex of the mesonotal spines bent backwards, and the spines on the pedicel diverge widely from their base.

481. **Polyrhachis horni**, *Emery, Deutsche ent. Zeit.* (1901), p. 122, ☿.

" ☿. Black, head and abdomen shining, devoid of pubescence, densely but finely punctured. Thorax with thick, light yellow, silky shining pubescence. Pedicel only above with similar but less

dense pubescence. Spines bare. Legs with thin grey pubescence. The exterior of the underside of the head and abdomen with very short erect hairs. Head highly convex, the antennal carinæ close together. The posterior margin shortly elevated. Eyes prominent, convex. Clypeus with the lobe truncate. Scape rounded. Thorax laterally sharply rounded. Pronotum with a curved spine on each side directed forwards, somewhat inwards and downwards. The lateral margins of the mesonotum and of the basal portion of the metanotum are furnished with triangular laminæ. The basal and sloping portions of the metanotum pass one into the other without an angle, and the margin on each side bears a small obtuse tubercle. Pedicel with four spines, the lateral short, pointing upwards, the median long, divergent, arched backwards and shaped to the curvature of the following segments.

"*Length*, ☿ 9–9·5 mm.

"♀. Colour, sculpture and pubescence as in the ☿. Spines on the pronotum and on the node of the pedicel much thicker and shorter; the tubercle on the metanotum, on the contrary, sharper and more prominent. *Length*, 10–10·5 mm." (*Emery*.)

Hab. Ceylon, Nalanda. Unknown to me.

482. **Polyrhachis mayri**, *Roger, Verz. Form. Gatt. u. Art.* (*Berl. ent. Zeit.* vii, 1863), p. 7, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 20 & 29, ☿.

Polyrhachis relucens, *Mayr* (*nec Latr.*), *Verh. zool.-bot. Ges. Wien*, xii (1862), p. 685.

☿. Black; covered with a dense golden recumbent pubescence, and with a fairly thick mass of short erect hairs. Head from in front very broadly oval, almost circular; clypeus convex, its anterior margin arched, antennal carinæ short, wide apart. Thorax strongly arched, compressed, wide anteriorly, narrowing rapidly posteriorly, slightly convex between the lateral margins, which are

Fig. 140.—*Polyrhachis mayri*, ☿.

deep, overhanging the vertical sides, pro-meso- and meso-metanotal sutures distinct; pronotal spines broad at base, slender and acute at apex, pointing almost horizontally forwards and outwards; a sharp transverse carina, with its lateral points subdentate, separates the basal portion of the metanotum from the oblique concave apex; legs moderately long, pubescent, the tibiæ cylindrical. Node of pedicel broad, cuneiform, biconvex, the upper lateral angles surmounted by spines diverging outwards, and below their bases on

each side of the node is a short laterally pointed acute tooth or spine; abdomen very massive, broadly oval.

♀. Similar, somewhat larger, with the mesonotum very long, convex above and gibbous; thoracic and pedicel spines shorter and thicker: wings flavo-hyaline, nervures brown.

Length, ☿ 9·5–10·5; ♀ 11–12 mm.

Hab. Bengal, Sikhim (*Möller*): Kanara (*Wroughton*); Travancore (*Ferguson*); Ceylon (*Yerbury*); Burma, Tenasserim (*Bingham*); extending down to the Malayan subregion.

A common species in Burma.

483. **Polyrhachis intermedia**, *Forel*.

Polyrhachis mayri, *race* intermedia, *Forel, Jour. As. Soc. Beng.* lv (1886), p. 242, ☿; *Jour. Bomb. N. H. Soc.* viii (1893), p. 20, ☿.

☿. Very similar to *P. mayri* and *P. proxima*. Resembles the former in having the thorax narrower posteriorly than in front, and the latter in wanting the transverse carina bordering the basal portion of the metanotum, in the closely approximate antennal carinæ, and the bimucronate lateral spines on the pedicel. Differs from both in having greyish, not golden pubescence very sparse, not hiding the sculpture; this gives it quite a different appearance.

Length. ☿ 8–9 mm.

Hab. Assam (*Smythies*); Burma: Myitkyina, Bhamo and the Ruby Mines (*Bingham*).

I am not quite certain whether I have identified this species correctly. I have not met with it further south in Burma than the Ruby Mines district.

484. **Polyrhachis proxima**, *Roger, Berl. ent. Zeit.* vii (1863), p. 155, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 20, ☿.

☿. Closely resembles *P. mayri*, being black and covered with similar dense golden shining pubescence, which hides the sculpture: but besides the bimucronate lateral spines on the pedicel, this species is shorter than *P. mayri*, with a proportionately wider thorax posteriorly, and with the antennal carinæ very much closer together.

♀. Resembles ♀ of *P. mayri*, but the mesonotum and scutellum are still more gibbous and raised than in that species.

Length, ☿ 8–9; ♀ 10 mm.

Hab. Burma (*Bingham*); Ceylon (*Yerbury*, *Green*); Malacca extending to Java.

485. **Polyrhachis striata**, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 686, pl. 19, fig. 8, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 19, ☿.

☿. Jet-black, with fairly abundant erect pubescence, black on the head, thorax, legs and the greater part of the abdomen above, reddish yellow beneath and on the apical segment. Head, thorax and node of pedicel longitudinally striate; abdomen very finely

punctured, rugulose and opaque, the punctures in certain specimens seem to run into minutely fine striæ. Head elongately oval, the cheeks nearly straight, the head behind the eyes narrowed, distinctly narrower than in front; clypeus angularly arched in front, tectiform, with a well-marked medial vertical carina; antennal carinæ long, closely approximate in front. Thorax with the lateral angles of the pronotum armed with two long strong broad-based spines, slightly curved downwards and pointing forwards and outwards; basal portion of metanotum transversely submargined, apical portion concave, striate, not smooth; legs long, the tibiæ not spinous beneath. Node of pedicel high, biconvex, armed at the upper lateral angles with two upright slightly divergent spines, as long as the pronotal spines or a little longer, and on the sides beneath the base of the above with a short, acute, laterally-pointed tooth; abdomen massive, much broader than the thorax.

Length, ☿ 9·5–10 mm.

Hab. Sikhim (*Möller*); Assam (*Long*); Burma (*Bingham*); Malacca, Sumatra, Borneo, Java.

486. **Polyrhachis hamulata**, *Emery* (sumatrensis, *Smith*, *race* hamulata), *Ann. Mus. Civ. Gen.* xxiv (1887), p. 234; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 21, ☿.

☿. Resembles *P. striata*, Mayr, but is a stouter, more heavily built insect. Black, with a dense erect yellowish-red pilosity and a thin, fine, silky sericeous pile, most dense on the abdomen but in no way hiding the sculpture. Head, thorax and abdomen closely and somewhat coarsely longitudinally striate, the striæ finer on the abdomen than on the head and thorax. Head broader posteriorly than in front; clypeus convex, not carinate. Thorax distinctly broader and more massive than in *P. striata*; pronotal spines pointing forwards and outwards; pro-meso- and meso-metanotal sutures deeply marked and incised laterally; basal portion of metanotum transversely margined and with an erect lateral tooth; apical portion concave, slightly striate and rugose; legs long, with longer and denser erect pubescence than on the thorax; tibiæ cylindrical, not spinous. Node of pedicel broad, biconvex, surmounted at its upper lateral angles by two slightly divergent erect spines, on each side beneath their bases is a laterally pointing acute shorter spine; there is also a distinct medial projection or tooth between the two longer spines; abdomen broadly oval, massive.

Length, ☿ 10–10·5 mm.

Hab. Assam (*Smythies*); Burma (*Fea*); Tenasserim (*Bingham*); Celebes (*apud Dalla Torre*).

487. **Polyrhachis yerburyi**, *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 20 & 29, ☿ ♀.

☿. Black, with a few erect yellow hairs on the front of the

head and the apical and under surfaces of the abdomen, and a very thin, more or less indistinct, recumbent yellow silky pile chiefly visible on the abdomen. Head rounder and shorter than in *P. striata*, Mayr, the cheeks and front very convex; clypeus convex, its anterior margin arched, not emarginate; the front of the head finely longitudinally striate. Thorax short, broad in front, compressed posteriorly, longitudinally striate; pro-mesonotal suture well-marked, laterally incised; meso-metanotal suture obsolete above, but the thorax incised laterally at the place; pronotal spines strong, acute, diverging outwards; basal portion of metanotum posteriorly transversely margined and with an erect short tooth at the posterior lateral angles; apical portion concave, smooth, shining, the striæ almost effaced; legs moderately long, opaque, without spines or hairs, the tibiæ cylindrical. Node of pedicel high, biconvex, striate, narrower proportionately than in *P. striata* and *P. hamulata*, surmounted at the lateral angles by two long erect spines, the space between which is concave; the sides of the node with a laterally pointing short acute spine, placed lower on the side of the node than in any of the preceding species; abdomen globose.

Length, ☿ 8–9 mm.

Hab. Ceylon (*Yerbury*).

488. **Polyrhachis striatorugosa**, *Mayr, Verh. zool.-bot. Ges. Wien*, xii (1862), p. 686, ☿, pl. 19, fig. 9; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 19, ☿.

"☿. *Length* 10 mm. Black, opaque, apex of the flagellum and claws reddish yellow, middle of the front tibiæ brown. An erect fox-red pubescence, somewhat plentiful on the whole body. A recumbent yellowish pile sparsely covering the head and abdomen. Mandibles finely and closely longitudinally striate, with scattered punctures. Clypeus feebly carinate, finely rugose; anterior margin rounded. The remainder of the head rather coarsely strigately rugose. Thorax as in the preceding two species rugose, longitudinally striate. Pronotum with two broad-based spines pointing forwards and outwards. The lateral angles of the basal portion of the metanotum toothed, the teeth short, vertical. Pedicel with a thick six-sided node surmounted by two rather short erect slightly divergent spines; the margin of the node between the two spines nearly straight, only with a median tubercle, the sides of the node bear a lateral and somewhat upward pointing spine, a little shorter than the upper two spines; node of pedicel rugose. The abdomen closely, distinctly longitudinally striate and rugose. Legs finely shagreened." (*Mayr.*)

Hab. Burma; Java (*Mayr*).

This species, unknown to me, seems very close to *P. hamulata*, Emery, distinguished chiefly by the shorter upper nodal spines.

489. **Polyrhachis convexa**, *Roger, Berl. ent. Zeit.* vii (1863), p. 153, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 19, ☿.

☿. Black, very finely rugulose, and covered with a very fine short, recumbent glistening grey pile. Head short, as broad posteriorly as in front, the cheeks very slightly convex, the eyes prominent; clypeus tectiform, rounded anteriorly; antennal carinæ divergent towards the vertex. Thorax, seen from the side, strongly arched, the pro-, meso- and basal portion of metanotum all broader than they are long; apical portion of metanotum deeply concave; pronotal spines short, acute, directed divergently forward; basal portion of metanotum bounded posteriorly by a

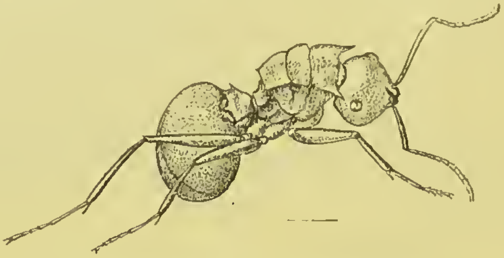

Fig. 141.—*Polyrhachis convexa*, ☿.

slight carina between two short erect points at its lateral posterior angles; legs moderately long, devoid of spines or erect hairs. Node of pedicel broad, biconvex, armed with four short subequal spines placed about equidistant from each other; abdomen short, globose.

Length, ☿ 5·5–6 mm.

Hab. Ceylon: Kandy, Jaffna (*Green*), Colombo (*Bingham*).

490. **Polyrhachis selene**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 518, ♀, pl. 11, figs. 18 & 19; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 18, ☿.

☿. Black, opaque; head and thorax finely, abdomen minutely and more finely rugulose, covered with a very short black erect pubescence. Head short, broad, convex, the occiput broad, almost flat, the posterior lateral angles well-marked, cheeks convex; clypeus convex, with a medial vertical carina, its anterior margin strongly arched and rounded; antennal carinæ not prominent, very wide apart. Thorax very broad; pronotum much broader than long, anteriorly transverse; lateral anterior angles pointed, but without spines; mesonotum flat, transversely oval; pro-mesonotal suture distinct; meso-metanotal suture impressed, very distinct; basal

Fig. 142.—*Polyrhachis selene*, ☿.

portion of metanotum flat, broader than long, with on each side a flat, horizontal, backward-pointing laminate spine, the two spines curve inwards like a pair of callipers; apical portion strongly concave, shining, overhung by the metanotal spines; legs moderately long, stout; tibiæ cylindrical, without spines. Node of pedicel thick, conical, raised in the middle, above transversely grooved; abdomen broad and comparatively massive.

Length, ☿ 3–4 mm.

Hab. Upper Burma, Maymyo, 3000 ft. (*Bingham*); Tenasserim, Kawkarait (*Fea*).

A remarkable and aberrant form superficially resembling species of the genus *Catalaucus* of the *Myrmicinæ*. Emery has further described a race or variety under the name *obtusata*. This has the abdomen more coarsely rugulose, and the node of the pedicel more rounded, blunt above.

491. **Polyrhachis jerdoni**, *Forel, Neujahrsblatt, Naturforsch. Ges. Zurich*, 1893, p. 491, ☿; *Jour. Bomb. N. H. Soc.* viii (1893), pp. 17 & 28, ☿ ♀.

☿. Black, with a bronzy tint; head and thorax closely and finely punctured, rugulose; abdomen more minutely punctured; mandibles, antennæ and legs red; pubescence almost entirely wanting. Head not very convex, broader posteriorly than in front; clypeus broader than high, medially vertically carinate, its anterior margin transverse; antennal carinæ short, widely separated. Thorax depressed, broad in front, with two widely divergent broad-based spines anteriorly, contracted posteriorly, with two obliquely erect, slightly divergent spines at the posterior lateral angles of the basal portion of the metanotum; the pronotum, the mesonotum and the basal portion of the metanotum all much broader than long; apex of metanotum very steeply sloped, slightly concave; legs stout, smooth, but opaque, without spines or hairs. Node of pedicel biconvex, broad above, with two widely-spread spines on its lateral angles, shaped to the curve of the abdomen, the upper margin of the node between the two spines obtusely biangular; abdomen broad, depressed, distinctly submargined anteriorly and on the sides.

♀. Similar; thorax more massive; thoracic and pedicel spines much shorter; wings flavo-hyaline.

Length, ☿ 5–6; ♀ 7–8 mm.

Hab. Ceylon (*Yerbury*).

492. **Polyrhachis punctillata**, *Roger, Berl. ent. Zeit.* vii (1863), p. 152, ☿ ♀; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 19, ☿.

Polyrhachis punctillata, *Roger, var.* smythiesi, *Forel, Jour. Bomb. N. H. Soc.* ix (1894), p. 456*.

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* Subsequently (Ann. Soc. Ent. Belge, xlvi (1902), p. 289) referred to as a race or subspecies, not a variety.

Polyrhachis subpilosa, *Emery, Ann. Mus. Civ. Gen.* xxxiv (1894), p. 480, ☿.

Polyrhachis punctillata, *Roger*, *race* fergusoni, *Forel, Ann. Soc. Ent. Belge*, xlvi (1902), p. 289, ☿.

☿. Black, opaque, minutely rugulose, with a very short and sparse covering of pale erect hairs and a thin fine silky pubescence. Head oval, vertex rounded, very little broader posteriorly than in front; clypeus broader than high and indistinctly medially carinate; antennal carinæ moderately wide apart. Thorax broad, narrowed posteriorly, laterally incised at the pro-meso- and meso-metanotal sutures, the former suture distinct, the latter nearly obsolete; anterior margin of pronotum undulate, the lateral angles armed with a strong triangular tooth pointing outwards; basal portion of metanotum trapezoidal, the lateral posterior angles each with a very short erect tooth, the bases joined by a slight carina; apical portion of metanotum concave; legs slender; tibiæ smooth, without spines. Node of pedicel biconvex, quadridentate, the teeth or little spines equidistant one from the other; abdomen broadly oval, very convex above.

" ♀. Black, with a distinct grey sheen. Head strongly longitudinally striate. Thorax intricately sculptured. Teeth of the metanotum distinct. Node of pedicel slightly emarginate, the lower lateral teeth more acute than in the ☿. Abdomen and the rest of the body as in the ☿. Wings brownish, with brown nervures; wing about 8 mm. in length." (*Roger.*)

Length, ☿ 5–6; ♀ 7 mm.

Hab. North-west Provinces (*Smythies*); Kanara (*Wroughton*); Burma, Pegu Yoma (*Allan*), Southern Shan States (*Thompson*); Ceylon (*Yerbury*).

The three varieties, races or subspecies, *Polyrhachis smythiesi*, Forel, *P. subpilosa*, Emery, and *P. fergusoni*, Forel, grade into typical *punctillata*, the chief difference being the length of the teeth or spines on the pedicel. These are longest, so far as the two middle spines are concerned, in *P. fergusoni*, and almost obsolete in *P. subpilosa*.

493. **Polyrhachis thrinax**, *Roger, Berl. ent. Zeit.* vii (1863), p. 152, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 18 & 28, ☿ ♀ ♂.

☿. Brownish yellow, the abdomen translucent yellow; head, thorax and node of pedicel rugulose granulate; legs and abdomen shining, smooth; pubescence almost entirely wanting, reduced to

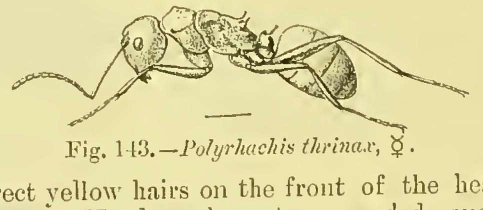

Fig. 143.—*Polyrhachis thrinax*, ☿.

a very few erect yellow hairs on the front of the head and apex of the abdomen. Head oval, vertex rounded, eyes large and

prominent; clypeus convex, anteriorly rounded, with a medial vertical carina; antennal carinæ very wide apart. Thorax wide in front, gradually narrowed posteriorly and slightly emarginate on each side at the meso-metanotal suture; pronotum arched anteriorly, truncate in the middle of the anterior margin, armed with a tooth on each side in the middle; basal portion of metanotum armed posteriorly with two stout erect short spines, apical portion slightly concave; legs long, moderately stout, the tibiæ without spines. Pedicel nodiform, longer than thick, with a single medial vertical spine, bimucronate at apex, and on either side of it and a little in front a very much shorter spine; abdomen broadly oval.

♀. Similar, larger; the thoracic spines shorter and stouter, the lateral spines on the node of pedicel longer, very little shorter than the medial spine, which however is shorter than in the ☿.

"♂. Brownish variegated with brownish yellow, flagellum of the antennæ darker. Shagreened, somewhat shining. Pedicel with a node more or less bituberculate or trituberculate at the apex above." (*Forel.*)

Length, ☿ 4·5–6; ♀ 8; ♂ 5·7–6 mm.

Hab. India: Bengal (*Rothney*), Kanara (*Wroughton*), Travancore (*Ferguson*); Ceylon (*Yerbury*); Burma, the Shan States (*Thompson*); Java.

Var. *lancearius*, Forel. "Node of pedicel at least as thick as wide, if not thicker" (*Forel*). Var. *javana*, Mayr, has the pronotal spines a little stouter and the pedicel spines subequal. There is one specimen from Calcutta of this latter variety in the collection of the British Museum.

494. **Polyrhachis frauenfeldi**, *Mayr, Verh. zool.-bot. Ges. Wien.* xii (1862), p. 687, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 18, ☿.

"☿. *Length* 8–9·5 mm. Black, the apex of the flagellum of the antennæ and the tarsi brownish yellow. Pubescence nearly wanting. Head, thorax and pedicel finely and closely punctured, cribrate and opaque. Thorax not short nor high, quadrilateral, with obtuse margins which are not incised. Pronotum with two triangular obtuse teeth. Metanotum with two teeth pointing outwards. Pedicel nodose above, thick, with a medial upwards and posteriorly directed straight spine and two teeth. Abdomen shining, finely transversely rugose coriaceous." (*Mayr.*)

Hab. Ceylon (*apud Forel*); Java (*apud Mayr*).

Unknown to me.

495. **Polyrhachis clypeata**, *Mayr, Verh. zool.-bot. Ges. Wien.* xii (1862), p. 683, ♀; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 19 & 29, ☿.

Polyrhachis indica, *Mayr, Verh. zool.-bot. Ges. Wien*, xx (1870), p. 945, ☿.

☿. Black; the mandibles, except the apex, and the legs red; the antennæ dark fuscous red; the head, thorax and abdomen

opaque, finely reticulate-punctate; pubescence very sparse, reduced to a few scattered erect hairs, chiefly on the apical abdominal segments; the whole insect covered with a very thin, fine, silky pile, visible only in certain lights. Head short, very broad, almost as broad posteriorly as in front; clypeus with a well-marked medial vertical carina and a distinct anteriorly produced rectangular lobe, the anterior margin of which is transverse and dentate; antennal carinæ widely separate. Thorax broad anteriorly, gradually compressed and narrowed towards the metanotum, the sides vertical; the pronotum and mesonotum each broader than long, the former arched anteriorly; pro-meso- and meso-metanotal sutures distinct and deeply impressed; basal portion of metanotum nearly square, the posterior lateral angles broadly turned upwards so as to form stout triangular projections, and making the upper surface of the metanotum concave from right to left; apical portion of metanotum nearly vertical, slightly concave; legs stout, tibiæ with extremely minute indistinct spines beneath. Node of pedicel slightly biconvex, armed with four short acute spines nearly equidistant from one another, the median spines nearly vertical, pointing a little backwards and slightly longer than the lateral, which point obliquely outwards and backwards; abdomen broadly oval, depressed, the front portion of the basal segment submargined.

♀. Similar to the ☿, but very much larger. Larger in proportion than the ♀ of any other *Polyrhachis* known to me. The thorax is not laterally margined as in the ☿; pronotum short, dentate on each side anteriorly; mesonotum raised above the pronotum, convex; metanotum depressed, the basal portion horizontal, convex, posteriorly deeply emarginate, the posterior lateral angles prominent but rounded; node of the pedicel armed with four equal teeth.

Length, ☿ 6·7; ♀ 9 mm.

Hab. Bengal (*Rothney*); Western India (*Wroughton*): Travancore (*Ferguson*); Ceylon (*Yerbury*).

496. **Polyrhachis rastrata**, *Emery, Ann. Mus. Civ. Gen.* xxvii (1889), p. 517, ☿; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 19, ☿.

"☿. Close to *P. indica* (recte *clypeata*), but distinguished by the regular longitudinal striate sculpture. In the form of the thorax, the armature of the same, the node of the pedicel and the form of the clypeus *P. rastrata* is similar to *P. indica*: but the sculpture of the head and thorax is different, also the punctures run into regular longitudinal striæ, close and fine on the head, sparser and deeper on the thorax." (*Emery.*)

Length, ☿ 7·5 mm.

Hab. Tenasserim (*Fea*).

Unknown to me. Described by Professor Emery from a solitary specimen. It is apparently very close both to *P. clypeata*, Mayr, and *P. halidayi*, Emery.

497. **Polyrhachis halidayi,** *Emery, Ann. Mus. Civ. Gen.* xxvii (1887), p. 517, ☿ ; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), p. 19, ☿.

☿. Resembles *P. clypeata*, Mayr, but is larger and more robust and the sculpture is entirely different. Black, the mandibles and legs castaneous red, the latter more or less shaded with fuscous; head and thorax neatly longitudinally striate; node of pedicel faintly and rather irregularly striate; abdomen smooth and shining, not opaqnc ; pilosity very sparse, recumbent pubescence fine, thin, sericeous and shining. Head comparatively shorter and, seen from in front, rounder than in *P. clypeata*; clypeus more convex and much more strongly carinate, anteriorly produced into a rectangnlar lobe as in *P. clypeata*, but the anterior margin, though transverse, is not dentate. Thorax broad in front, narrow posteriorly, the pro-mesonotal suture broad and deep, the meso-metanotal suture marked by a transverse carina; the pronotum

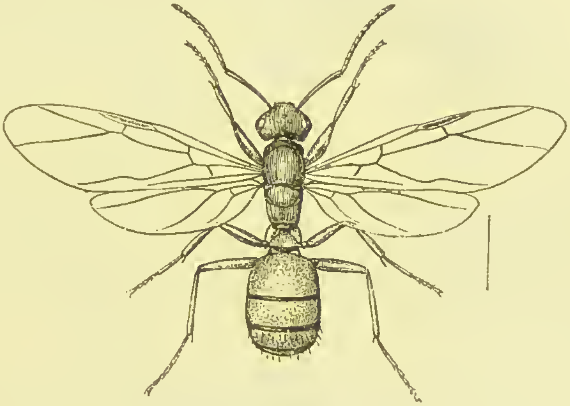

Fig. 144.—*Polyrhachis halidayi*, ♀.

angular laterally; the basal portion of the metanotum flat, not concave, the teeth or spines at the posterior lateral angles minute; apical portion of metanotum concave, shining, very minutely transversely striate; legs robust, tibiæ smooth, not spined. Node of pedicel biconvex, thicker than in *P. clypeata*, and qnadrispinons as in that species, but the lateral spines are broader and placed higher up on the node, and the two medial spines are reduced to obtuse teeth and placed mnch closer together; abdomen broadly oval.

♀. Very similar to the ☿, the striæ on the head and thorax coarser, the pronotum laterally obtusely angled; the basal portion of the metanotum transversely rectangular, its posterior margin widely emarginate, the lateral angles slightly turned up; the abdomen longer and more massive; the soft fine sericeous recumbent pile much denser, especially on the abdomen, and of a reddish yellow.

Length, ☿ 6–7; ♀ 8 mm.

Hab. Burma; Tenasserim up to 5000 ft. (*Fea & Bingham*). A common species in the Pegu Yoma, making comparatively large nests among the leaves of trees.

498. **Polyrhachis rastellata**, *Latr. Hist. Nat. Fourm.* 1802, p. 130, ♀; *Forel, Jour. Bomb. N. H. Soc.* viii (1893), pp. 21 & 30, ☿.
Polyrhachis busiris & euryalus, *Smith, Journ. Linn. Soc.* v (1861), p. 98, pl. 1, fig. 15, ☿, & vii (1863), p. 16, ☿.

☿. Black; the coxæ, femora and tibiæ of the legs blood-red, the anterior coxæ shaded with fuscous, the tarsi opaque, black. Head, thorax and abdomen shining, polished and smooth; recumbent pubescence nil, pilosity very sparse, short and scattered. Head triangular, very broad posteriorly, the vertex and occiput rounded; clypeus convex, not carinate anteriorly, broadly emarginate in the middle; antennal carinæ widely divergent posteriorly. Thorax very convex and rounded above viewed from the side, strongly arched and gibbous anteriorly; pro-mesonotal suture distinct; meso-metanotal suture obsolete; legs moderately long, smooth, not spined. Node of pedicel thick at base, sloping rapidly to a sharp margin above, the latter armed with four subequal acute teeth or spines, the median two close together and vertical; abdomen globose, very convex above.

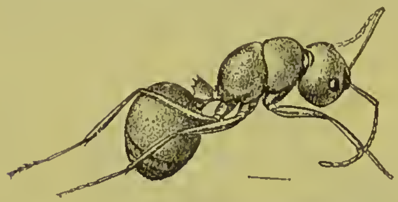

Fig. 145.—*Polyrhachis rastellata*, ☿.

♀. Very similar to the ☿, but the thorax very broad and massive, the node of the pedicel entirely unarmed and the abdomen larger.

Length, ☿ 5–6·5; ♀ 8 mm.

Hab. South Konkan (*Wroughton*); Kanara (*Aitken*); Ceylon (*Yerbury*); Burma: Tenasserim (*Bingham*); Siam; Sumatra; Borneo.

Tribe TUBULIFERA.

Family CHRYSIDIDÆ.

The members of the tribe *Tubulifera* are entirely parasitic, and occupy a position intermediate between the true *Parasitica* and the *Aculeata*. According to M. du Buysson, who has made a special study of the tribe, the *Tubulifera* are allied to the family *Proctotrypidæ* of the *Parasitica*, but they have the trochanters of the legs one-jointed, and one genus, *Cleptes*, possesses both poison-glands and sting, thus bringing the tribe into close relationship with the true *Aculeata*. The *Tubulifera* comprise but one family, the *Chrysididæ* or Cuckoo-wasps, characterized by a very hard and chitinous covering, more or less strongly and closely punctured, and always brilliant with metallic colours, chiefly greens and blues, with or without cupreous red or golden tints or spots.

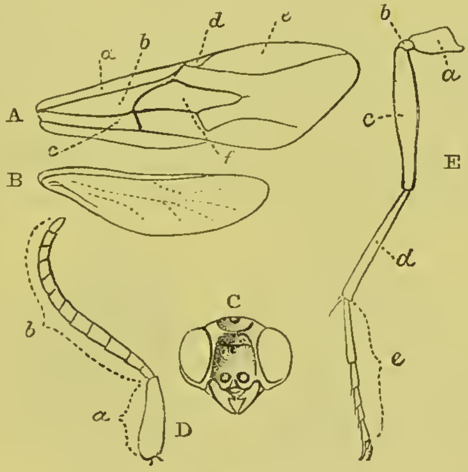

Fig. 146.—*Chrysis*.

A. Fore wing: *a*, costal cell; *b*, medial cell; *c*, submedial cell; *d*, stigma; *e*, radial cell; *f*, 1st discoidal cell.
B. Hind wing. C. Head.
D. Antenna: *a*, scape; *b*, flagellum.
E. Leg: *a*, coxa; *b*, trochanter; *c*, femur; *d*, tibia; *e*, tarsus.

The head may be entirely rounded, subcubical or more or less triangular, often transverse, broader than long; the mandibles short and slightly curved, simple or dentate at apex, in repose hidden under the clypeus; clypeus transverse, very short, often porrect in the middle, occasionally anteriorly emarginate; cheeks and sides of the head behind the eyes short, the latter rarely somewhat produced; face up to the front and between the eyes more or less deeply hollow, concave; the antennæ, when at rest, folding into the cavity; antennæ simple, in one genus, *Pleurocera* (so far not recorded from India), the joints of the flagellum are curiously flattened and twisted; front and vertex more or less convex; occiput transverse, emarginate or rounded; eyes very large, lateral;

ocelli always present; mouth-parts similar to those of other Hymenopterous insects (*vide* p. iv, Introduction to Hymenoptera, Vol. i.); except in the subfamily *Parnopinæ* the maxillary palpi are 5-, the labial palpi 2–3-jointed. In *Parnopes* the maxillary and labial palpi are both 2-jointed, but the mouth-parts are enormously prolonged and exserted as in many of the *Apidæ*.

Fig. 147.

A. Thorax (*Chrysis*): side view.
B. Thorax (*Chrysis*): from above. *a*, collar; *b*, pronotum; *c*, medial area mesonotum; *d*, *d*, lateral areas mesonotum; *e*, scutellum; *f*, postscutellum.

Thorax subcylindrical, more or less convex, anteriorly broad, widely arched or truncate, posteriorly truncate; pronotum always broader than long, more or less transversely rectangular; mesonotum divided by well-marked parapsidal grooves into three areas, the medial area always longitudinally rectangular; mesopleuræ may be flat, depressed or convex, more or less coarsely sculptured, angular or dentate at apex; scutellum convex, often transverse,

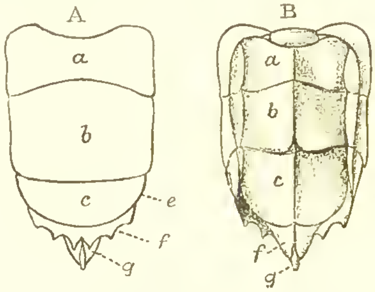

Fig. 148.

A. Upper side abdomen (*Chrysis*): *a*, *b*, *c*, 1st, 2nd, and 3rd segments: *e*, basal area 3rd segment; *f*, apical area of 3rd segment; *g*, retractile segments partially exserted.
B. Under side abdomen (*Chrysis*): *a*, *b*, *c*, 1st, 2nd, and 3rd ventral segments: *f*, retractile segments; *g*, ovipositor.

never very narrow; postscutellum in the majority of cases convex, often gibbous, occasionally mucronate at base; median segment suppressed beneath the postscutellum; the posterior lateral angles always produced and more or less prominent; the stigmata placed above or in the hollow below them: wings never very long, with few nervures and cells; legs moderately slender; the trochanters one-jointed; the femora compressed, broadest in the middle; tibiæ more or less cylindrical, the anterior tibiæ with one, the intermediate and posterior tibiæ with two calcaria.

Abdomen (fig. 148) pseudosessile, more or less transverse at base, either convex above and below (*Cleptinæ*), or convex above and concave below (remaining subfamilies), oval, roundly subquadrate, elongate, with the sides parallel, or broad at base with the sides (sometimes only sides of the apical segment) convergent posteriorly. In only two subfamilies the abdomen has more than three visible segments, the remaining segments being highly contractile, tubular, and generally only in the ♀ partially exserted.

The Chrysididæ may for our limited fauna be conveniently divided into four subfamilies characterized as follows:—

Key to the Subfamilies.

a. Abdomen convex both above and below . . *Cleptinæ*, p. 417.
b. Abdomen convex above, concave below.
  a'. Claws of the tarsi dentate . . . . *Ellampinæ*, p. 418.
  b'. Claws of the tarsi simple, not dentate.
    a². Mouth-parts, maxillæ, and labium short, not exserted in repose; ♀ & ♂ with three visible segments . . *Chrysidinæ*, p. 430.
    b². Mouth-parts, maxillæ, and labium remarkably long, exserted, in repose folded beneath the thorax as in many of the *Apidæ*: ♀ with three, ♂ with four visible segments. *Parnopinæ*, p. 495.

Subfamily CLEPTINÆ.

The *Cleptinæ* comprise two genera, *Cleptes*, Latr., and *Heterocœlia*, Dahlb. No representative of either has, so far as I am aware, been recorded from within our limits, but species of *Cleptes* very probably, and of *Heterocœlia* possibly, may be discovered in the mingling of Palæarctic with Indo-Malayan forms occurring in Northern India and at high elevations further south and east: I give, therefore, diagnoses of both genera.

Key to the Genera.

a. Apical abdominal segment unarmed, not dentate . . . . CLEPTES, p. 417.
b. Apical abdominal segment dentate . . . . HETEROCŒLIA, p. 418.

Genus CLEPTES.

Cleptes, *Latr. Hist. Nat. Crust. Ins.* iii (1802), p. 316.

Type, *C. semiauratus*, Linn., from Europe.
Range. Both hemispheres.

♀ ♂. Head transverse, globose; occiput transverse, as broad as the front of the pronotum, vertex and front convex; face slightly concave, but no regular facial cavity; antennæ moderately long and thick, cylindrical; mandibles short, broad, tridentate at apex. Thorax: the pronotum subcylindrical, compressed, shaped like a neck,

narrower than the head; mesonotum and scutellum convex, the former with 4 longitudinally impressed lines; mesopleuræ convex, oblique, not acute at apex; postscutellum strongly convex; posterior lateral angles of median segment produced, acute at apex; wings ample; fore wing with costal, medial, the 1st discoidal and radial cells complete, the 1st submedial cell open towards the apex, the 2nd submedial incomplete, the rest not formed; legs slender; femora and tibiæ normal, claws of the tarsi unidentate. Abdomen pseudosessile, convex above and below, the sides posteriorly strongly convergent, the apex of the abdomen pointed, not dentate; the ♀ with 4, ♂ with 5 visible segments.

Genus HETEROCŒLIA.

Heterocœlia, *Dalhb. Hym. Eur.* ii (1854), p. 21.

Type, *H. nigriventris*, Dahlb., from Algeria.

Range. Known so far only from Algeria.

♀. Head flat, the vertex not broad; eyes very small, rounded; antennæ of moderate length, placed on little raised, rounded, projections; clypeus strongly vertically carinate. Thorax: the pronotum anteriorly forming a collar, longitudinally sulcate on the disc. Mesonotum with lateral areas simple; no postscutellum; fore wing with only the costal and medial cell complete, the radial cell incomplete, the remaining cells obsolete. Abdomen normally formed, narrowing to the apex posteriorly; in ♀ with 6 visible segments, the apical segment attenuate; in ♂ (*apud* Dahlb.) with 5 visible segments, the apical segment triemarginate or quadridentate along posterior margin.

Subfamily ELLAMPINÆ.

Insects of small size, the majority smaller than the majority of the species of the *Chrysidinæ*; stoutly built. Head more or less transverse and short; facial cavity generally present; antennæ 13-jointed in both ♀ and ♂. Thorax short and broad, the pronotum longer proportionately than in the *Chrysidinæ*; wings ample, fore wing with the basal nervure more or less arched inwards; stigmata placed *above* the produced posterior lateral angles of the median segment close to the bases of the hind wings; claws of the tarsi dentate; abdomen broad, very convex above, the apical margin incised, subtruncate, sinuate or entire, or only feebly angular, subdentate laterally, never strongly dentate.

The species are parasitic on the *Fossores* and on the *Apidæ*.

Key to the Genera.

A. Claws of tarsi multidentate.
  a. Fore wing with medial cell only complete; apical margin of abdomen truncate or subtruncate in middle and incised . . . . Ellampus, p. 419.

b. Fore wing with medial and 1st discoidal cells complete, outer nervures of latter outlined only in light brown but distinct; apical margin of abdomen rounded, entire .... HOLOPYGA, p. 421.

B. Claws of tarsi unidentate.

a. Apical margin of abdomen rounded, entire; teeth on claws of the tarsi placed at a right angle to the inner margin of claw .... HEDYCHRIDIUM, p. 424.

b. Apical margin of abdomen laterally angular or subdentate; teeth on claws of tarsi not at right angles, apex merely bifid .... HEDYCHRUM, p. 427.

It is possible that two other genera of the *Ellampinæ* may occur in India. These are characterized as follows:—

HOLOPHRYS, Mocsáry. "Sides of the pronotum narrowly applied against the anterior margins of the mesopleuræ, its sides as long as these margins; no posterior lateral angles to the metapleuræ; apical margin of 3rd abdominal segment entire" (*du Buysson*). Founded on a species from Sumatra. A second species has been described by du Buysson from the regions of the Congo in West Africa.

PHILOCTETES, du Buysson. "Posterior tibiæ (especially in the ♂) dilated. In the ♂ these are also slightly hollowed. Third abdominal segment very lightly sinuate at apex." (*du Buysson.*)

Genus **ELLAMPUS.**

Elampus, *Spin. Ins. Lig.* i (1806), p. 10.
Notozus, *Först. Verh. nat. Ver. preuss. Rheinl.* x (1853), p. 331.
Omalus et Elampus, *Dahlb. Hym. Eur.* ii (1854), pp. 26 & 38.

Type, *E. auratus*, Linn., from Europe.

Range. Both hemispheres.

♀ ♂. Head transverse, as broad as the pronotum or broader; facial cavity subtriangular, the arch above narrowing distinctly, moderately deep; antennæ slender, cylindrical. Thorax broad, very convex above; the pronotum long or short, often shorter than the mesonotum, transverse; metanotum and scutellum convex, the former sometimes gibbous anteriorly; mesopleuræ convex or flat, the apex beneath more or less rounded; postscutellum convex, gibbous or with a mucro at base; posterior lateral angles of median segment produced, apex acute or obtuse. Wings: fore wing with medial cell only complete, the 1st submedial and sometimes the radial cell almost complete, generally two-thirds of the apical portion of the radial nervure is obliterated, occasionally the 2nd submedial cell is faintly outlined; nervures and cells of the hind wing obsolete; legs slender, the posterior tibiæ not incrassate; the claws of the tarsi multidentate. Abdomen very convex above, the base transverse, the apical margin rounded at the sides, truncate and incised in the middle.

Only two species have so far been recorded from India.

Key to the Species.

a. Postscutellum without a mucro .... *E. timidus,* p. 420.
b. Postscutellum with a mucro at base ...... *E. kashmirensis,* p. 420.

499. **Ellampus timidus,** *Nurse, Entomologist,* xxxv (1902), p. 305, ♀ ♂. (Pl. I, fig. 11.)

♀. Head dark blue, thorax bluish green, abdomen dark indigo-blue, appearing black in certain lights, antennæ dark brown, the scape purple, tarsi yellowish brown; head above and thorax anteriorly with large, coarse, somewhat effaced punctures; thorax posteriorly cribrate; abdomen smooth, very highly polished, unpunctured; facial hollow smooth, polished and shining within, without pubescence; pilosity very sparse, fine and short, only visible in certain lights. Head transverse, very broad, almost twice as broad as long; eyes proportionately large and prominent; facial hollow deep, rounded above, with a very narrow but distinct chitinous brown margin; antennæ thick, comparatively long, the 2nd joint of the flagellum the longest; vertex and front broad, convex; occiput sharply transverse. Thorax: the pronotum declivous, nearly vertical, broad, rounded from side to side anteriorly; the propleuræ flat, slightly excavate; mesonotum, scutellum and postscutellum very convex; mesopleuræ broad, subtriangular, punctured, the apex beneath not acute; median segment with the posterior lateral angles strongly produced, broad, acute at apex; wings delicate, hyaline and iridescent, nervures brown, tegulæ green; legs slender. Abdomen short, broad and convex, the base transverse, the apex declivous, acutely rounded; the apical margin in the middle transverse, chitinous, translucid, and minutely emarginate.

"♂. Similar, more conspicuously shining; vertex of head, pronotum and mesonotum above almost, if not quite, impunctate." (*Nurse.*)

Length, ♀ ♂ 2·5–3; *exp.* 5 mm.

Hab. Baluchistan; Quetta, Pishin (*Nurse*).

500. **Ellampus kashmirensis,** *Nurse* (Notozus), *Entomologist,* xxxv (1902), p. 305, ♀ ♂.

♀ ♂. Metallic purple-blue, turning to green in certain lights, the flagellum of the antennæ dark brown, the tarsi reddish brown; head and thorax somewhat sparsely and moderately coarsely punctured, the punctures minute and dense along the anterior margin of the mesonotum, and very large and rugose on the scutellum, postscutellum and median segment; abdomen very minutely, regularly and rather closely punctured; facial cavity finely striate, the striæ running from each side obliquely upwards; pilosity brownish, very short and sparse. Head about as long and as broad as the pronotum, to which it is closely applied; occiput transverse, vertex and front sloping, anteriorly rounded, slightly convex; facial cavity shallow, grooved longitudinally in

the middle; antennæ long, filiform, the 2nd joint of the flagellum the longest, the 1st joint very short; clypeus broad, slightly raised in the middle anteriorly. Thorax: the pronotum very convex, subcylindrical, the sides nearly parallel; propleuræ slightly hollow; mesonotum and scutellum strongly convex; mesopleuræ oblique, convex, strongly but not rugosely punctured, the apex slightly excavate; postscutellum with a large elongate triangular mucro at base; posterior lateral angles of the median segment produced, comparatively broad at base, suddenly attenuate towards apex; wings hyaline, nervures and tegulæ brown, the latter shining, slightly aëneous. Abdomen convex, transverse at base, suboval, the sides strongly convergent posteriorly, the apical margin truncate.

Length, ♀ ♂ 4–5; *exp.* 8–9 mm.

Hab. So far recorded only from Kashmir, 5000 ft. (*Nurse*).

Genus **HOLOPYGA**.

Holopyga, *Dahlb. Hym. Eur.* 1854, p. 47.

Type, *H. ventralis*, Say, from America.

Range. Both hemispheres.

♀ ♂. Head transverse, shorter than the pronotum or equal to it; facial hollow moderately deep; mandibles bi- or tridentate; antennæ filiform, moderately long. Thorax short and very stoutly built, strongly convex above; pronotum long, massive, as long as the mesonotum or longer; mesonotum and scutellum transverse; mesopleuræ lightly convex, subtriangular, acute beneath; postscutellum rounded, convex, sometimes a little gibbous, never mucronate; median segment truncate posteriorly, the posterior lateral angles produced. Wings: fore wing with complete medial and 1st discoidal cells, the outer nervures of the latter cell somewhat more faintly outlined; the other cells entirely or partially incomplete; *the basal nervure bent inwards towards the base of the wing, distinctly angular, not curved.* Legs with the femora and tibiæ normal, the claws of the tarsi with from 2 to 5 teeth. Abdomen pseudosessile, short, stoutly built, broad and very convex above, the apical margin regularly completely rounded, never truncate, incised or dentate.

Key to the Species.

a. Abdomen green or bluish green, not broader than pronotum.
  a'. Head as broad as pronotum; pronotum transverse, not rounded nor declivous anteriorly .... *H. indica*, p. 422.
  b'. Head narrower than pronotum; pronotum not transverse, rounded and declivous anteriorly .... *H. nursei*, p. 423.
b. Abdomen cupreous golden, broader than pronotum .... *H. cupreata*, p. 423.

501. **Holopyga indica,** *Mocsáry, Mon. Chrys.* 1889, p. 118, ♀.

♀. Dark metallic green with blue shades in certain lights, in some specimens the mesonotum and abdomen almost entirely metallic blue; antennæ black, the scape in front purple or green according to the light; legs green, tarsi light brown; head and pronotum moderately finely but irregularly punctate; mesonotum, scutellum and postscutellum very coarsely punctured, cribrate, the punctures with minute punctures within and in the interspaces; abdomen finely and densely punctured, the punctures even and regular on the basal two segments, larger on the apical segment; facial cavity finely transversely and somewhat obliquely striate, without pubescence obscuring the sculpture; pilosity very sparse, pubescence fine, almost invisible. Head broad but short, about half as long as the pronotum, from the front subtriangular,

Fig. 149.—*Holopyga indica*, ♀. *a.* Outline of head in profile; *b.* Tarsus and claws.

the cheeks strongly convergent, the eyes large; clypeus broad, smooth, almost unpunctured, strongly emarginate in the middle anteriorly; facial cavity very shallow, not margined above; antennæ slender, the 2nd joint of the flagellum very long, more than twice as long as the 1st; front somewhat flat, vertex convex, occiput sharply transverse, very widely but very distinctly emarginate; the temples strongly triangularly produced posteriorly. Thorax: the pronotum convex, transversely subrectangular, the sides somewhat convergent anteriorly, the anterior margin narrowly depressed; propleuræ deeply excavate; mesonotum, scutellum and postscutellum convex; the mesopleuræ very large, flat, shaped somewhat like the apical half of a lanceolate leaf, margined, the apex acute; the posterior lateral angles of the median segment broadly produced and acute at apex; wings slightly fusco-hyaline, iridescent, nervures and tegulæ brown. Abdomen short, broad, strongly convex above, sharply transverse at base, the apex rounded, the margin entire.

♂. Almost identical, smaller, the puncturing somewhat coarser, especially on the 3rd abdominal segment; the pronotum shorter, the abdomen proportionately not so broad.

Length, ♀ 6–6·5, *exp.* 12; ♂ 5, *exp.* 10 mm.

Hab. India Orientalis (*apud Mocsáry*); Delhi (*Bingham*): Rajputana, Mount Abu (*Nurse*). The specimens from Mount Abu are more blue than green.

502. **Holopyga nursei**, sp. nov. (Pl. I, fig. 16.)

♂. Bright metallic green, with blue shades in certain lights, the lateral areas of the mesonotum and the scutellum aëneous golden; antennæ dark brown, the scape in front purple, the tarsi yellowish brown; head and pronotum moderately punctured, the punctures on the pronotum rather sparse, with minute punctures in the interspaces, rest of the thorax and the median segment cribrate, the large coarse punctures minutely punctured within; abdomen very finely and closely punctured, the punctures shallow; facial cavity minutely transversely striate, with a fine thin whitish pubescence not hiding the sculpture; pilosity whitish, moderately abundant, very short. Head thick, not quite so broad as the pronotum and a little longer than broad; clypeus broad, arched anteriorly and emarginate in the middle; facial hollow deep, arched above, not margined; antennæ long, the 2nd joint of the flagellum twice as long as the 1st, the 3rd and 4th joints subequal; front and vertex very convex, moderately broad; occiput widely and very distinctly emarginate, the sides behind the eyes produced posteriorly but not so prominently as in *H. indica*. Thorax: the pronotum long and massive, very convex, slightly declivous anteriorly, the sides somewhat converging to the front; propleuræ excavate; mesonotum, scutellum and postscutellum convex, the latter with a gentle rounded slope posteriorly; mesopleuræ rugose, strongly convex, the apex beneath subacute; postscutellum large and prominent, overlying the median segment, this latter with large shallow foveæ at the sides, the posterior lateral angles produced, thick, acute at apex; wings hyaline, iridescent, the nervures light, tegulæ dark testaceous brown; legs moderately long and stout. Abdomen short, broad, very convex above, truncate at base, broadly rounded at apex, the margin entire.

Length, ♂ 4·5; *exp.* 8·5 mm.

Hab. Northern Gujerat, Deesa (*Nurse*).

503. **Holopyga cupreata**, *Nurse, Entomologist*, xxxv (1902), p. 305, ♂.

"♂. Front below vertex to base of antennæ very concave, and finely transversely striate; head behind ocelli somewhat finely punctured; remainder of head, thorax and median segment coarsely, abdomen closely and finely punctured; head slightly wider than pronotum; abdomen slightly longer and broader than thorax; a little short sparse pubescence, visible only with a lens, on the head, legs and abdomen; a trace of a median longitudinal carina on the 2nd abdominal segment. Head and thorax dark blue, the vertex, pronotum and mesonotum with a greenish tinge; abdomen brilliant coppery golden, scape of antennæ dark blue, flagellum and tarsi very dark testaceous, almost black; wings hyaline at base, the outer half tinged with fuscous, the tegulæ black." (*Nurse.*)

Length, ♂ 5·6 mm.

Hab. Kashmir, 5000–6000 feet; two specimens.

Unknown to me.

Genus HEDYCHRIDIUM.

Hedychrum, pt., *Latr. Hist. Nat. Crust. Ins.* iii (1802), p. 317.
Holopyga, pt., *Dahlb. Hym. Eur.* ii (1854), p. 47.
Hedychridium, *Ab. de Perrin, Ann. Soc. Linn. Lyon*, xxvi (1879), p. 35.

Type, *H. anale*, Dahlb., from Europe.

Range. Both hemispheres.

♀ ♂. *Hedychridium* is closely allied both to *Holopyga* and *Hedychrum*. It is considered by Mocsáry to form only a subgenus of the former. From *Holopyga* it can be distinguished by the basal nervure of the fore wing being straighter, only slightly curved, never bent inwards at an angle, and by the unidentate claws to the tarsi. From *Hedychrum* it is separated by the rounded, entire, not laterally angular nor subdentate apical margin of the abdomen, and by the tooth on the claws of the tarsi being farther away from the apex of the claw and at right angles to its underside.

Key to the Species.

a. Extreme apical margin of abdomen channeled and very narrowly curled upwards ...... *H. wroughtoni*, p. 425.
b. Apical margin of abdomen not channeled nor curled upwards.
  a'. Pronotum anteriorly with a short transverse deep impression .... *H. perversum*, p. 424.
  b'. Pronotum anteriorly without such impression.
    a². Sides of 1st abdominal segment more coarsely punctured than disc .... *H.* (?) *rugosum*, p. 425.
    b². First abdominal segment uniformly punctured.
      a³. Sides of pronotum parallel; abdomen dark blue, 2nd segment with purple reflections .... *H. selectum*, p. 426.
      b³. Sides of pronotum very distinctly convergent anteriorly; abdomen on the discs of the segments fiery cupreous golden .... *H. minutum*, p. 427.

504. **Hedychridium perversum**, *Nurse, Entomologist*, xxxv (1902), p. 306, ♀ ♂. (Pl. I, fig. 8.)

♀. Metallic green with in certain lights a bluish shine, abdomen with a coppery effulgence from the apical half of the basal segment down to the apex; antennæ: the scape green above, the flagellum brown, the tarsi of the legs light yellowish brown; head, thorax and abdomen punctured, the punctures on the head and thorax tolerably close but not dense and somewhat shallow, larger and farther apart on the scutellum and postscutellum; on the abdomen the punctures are fine and regular: facial hollow finely transversely striate, covered densely with rather long white pubescence, that hides the sculpture; pilosity whitish, abundant,

Head very broad, with the eyes broader than the pronotum and much broader than long, the sides strongly convergent anteriorly; antennæ comparatively long and slender, densely pubescent, the 2nd joint of the flagellum longer than the 1st; facial hollow deep, not margined above, no transverse carina on the front; vertex and front broad and convex, occiput slightly and widely emarginate. Thorax: the pronotum comparatively long and massive, transversely rectangular, the front with a short transverse deep impression; propleuræ slightly hollow, smooth, unpunctured posteriorly; mesonotum and scutellum convex; mesopleuræ coarsely punctured, slightly convex, triangular, the apex beneath acute; postscutellum very rounded and convex; the posterior lateral angles of the median segment produced, somewhat broad, acute at apex; wings iridescent, nervures and tegulæ brown, the latter green at base; legs rather long and slender. Abdomen very broad, very convex above, somewhat roundly truncate at base, steeply sloped and acutely arched posteriorly; the 3rd segment with a very narrow apical margin undulate posteriorly, the anteapical series of foveæ very indistinct.

♂. Similar; a little smaller.

Length, ♀ ♂ 2·3–3; *exp.* ♀ ♂ 5 mm.

Hab. Baluchistan, Pishin (*Nurse*).

505. **Hedychridium wroughtoni**, *du Buysson, Jour. Bomb. N. H. Soc.* x (1896), p. 466, pl. ii, fig. 6, & pl. v, fig. 4.

"♀. Body robust, depressed, entirely bright green, with bluish shades on the abdomen and on the median area of the mesonotum. Pubescence fine, reddish brown and slightly recumbent. Antennæ brownish, the first two joints (*i. e.* the scape and the 1st joint of the flagellum) green. Pronotum long, depressed, the sides convergent anteriorly; the puncturing moderate, dense, irregular, deep, that on the rest of the thorax larger and less close together, becoming coarse and reticulate on the postscutellum and the mesopleuræ. Wings fuscous; legs green, with the joints and the tarsi reddish brown. Abdomen somewhat convex, with fine, widely spaced punctures; the 3rd segment entire, the extreme margin very characteristic, attenuate, channeled, then slightly turned upwards. The ventral side green, the segments margined with black." (*du Buysson.*)

Length, ♀ 7·5 mm.

Hab. Central Provinces of India (*Wroughton*). Unknown to me.

506. **Hedychridium (?) rugosum**, *Smith* (Hedychrum), *A. M. N. H.* ser. 2, ix (1852), p. 45; *Mocsáry* (Holopyga), *Mon. Chrys.* 1889, p. 125.

♀ (?). Metallic green, the abdomen in certain lights blue; antennæ dusky black, the scape and 1st joint of flagellum above

green; head and thorax coarsely, closely punctured, rugose, the punctures serried, running into reticulations on the side-areas of the mesonotum, on the scutellum and postscutellum; abdomen finely and more sparsely punctured, the punctures coarser but not serried or reticulate on the sides of the basal segment. Head as broad as the pronotum, the occiput sharply transverse, the vertex and front convex; the facial cavity deep, rugose within and medially longitudinally grooved, above arched, not margined; antennæ cylindrical, the 2nd joint of the flagellum the longest. Thorax massive; the pronotum very convex, subcylindrical, the sides convergent anteriorly, propleuræ excavate; mesonotum and scutellum strongly convex; mesopleuræ large, convex, scutiform, the apex not separated from the rest by groove or carina; postscutellum large, strongly convex; posterior lateral angles of the median segment narrowly produced, acute at apex. Abdomen broad, short, strongly convex above, the base transverse, the apical margin regularly rounded, not angular nor subdentate at the sides.

Length, ♀ (?) 6·5 mm.

Hab. Western India, Poona (*Capt. Downes*).

The above description and the particulars of locality are taken from a solitary specimen in the collection of the Brit. Mus. The specimen is not labelled "*type*," and is in very bad condition, minus the wings, a good portion of all the legs and of the antennæ, but the size, sculpture, name and locality given on the label agree with Smith's description of his *Hedychrum rugosa*. The abdomen being entirely rounded, I have with some doubt entered it under the genus *Hedychridium*.

507. **Hedychridium selectum**, *Nurse, Entomologist*, xxxv (1902), p. 306.

"♂. Head and thorax closely and finely, postscutellum more coarsely, abdomen minutely and closely punctured; pronotum and head subequal, the former with its sides parallel; abdomen wider than thorax, very convex, 3rd segment almost vertical. Dark blue, 2nd abdominal segment with purple reflections; antennæ dark rufous, tarsi testaceous; wings hyaline, their apical margins very slightly darker, nervures and tegulæ testaceous; a little sparse short greyish pubescence on head, thorax, abdomen and legs.

"*Length*, ♂ 3·5 mm.

"*Hab.* Quetta; a single specimen.

"This species is easily distinguished from *H. perversum* by its being dark blue and not light green, and by its longer pronotum. The basal nervure is also more sharply curved in *H. selectum* than in *H. perversum*." (*Nurse.*)

Unknown to me.

508. **Hedychridium minutum**, *Lepel.* (Hedychrum), *Ann. Mus. Hist. Nat.* vii (1806), p. 122, pl. 7, fig. 9, ♂; *du Buysson, Rev. d'Ent.* (1900), p. 128.
? Chrysis ardens, *Coquebert, Illustr. Icon. Ins.* dec. ii (1801), p. 59, pl. xiv, fig. 7.

♀ ♂. Head and thorax green, with more or less of cupreous effulgence on the vertex, the pronotum posteriorly, and on the mesonotum and scutellum; postscutellum light green, in certain lights cupreous golden; the face, pronotum anteriorly, and sides of the thorax green without any golden effulgence; abdomen on the discs of the segments fiery cupreous golden, the sides and base in certain lights greenish golden; head and thorax moderately finely punctured, the punctures larger and reticulate on the postscutellum; abdomen minutely and closely punctured; facial cavity minutely rugulose; pilosity brown, short and sparse. Head a little broader than the pronotum, the occiput and front from above flat and transverse; vertex convex; facial cavity shallow; antennæ short, moderately thick; 2nd joint of the flagellum longer than the 1st or 3rd; clypeus moderately long and broad, raised in the middle. Thorax: the pronotum from above longer than the head, transverse, slightly sloping in front, sides convergent anteriorly; propleuræ slightly excavate; mesonotum and scutellum gently convex; mesopleuræ flat, subtriangular; postscutellum strongly convex, somewhat gibbous posteriorly; posterior lateral angles of median segment largely produced, acute at apex; wings slightly fusco-hyaline beyond the disc, which is clear hyaline; nervures and tegulæ aëneous brown. Abdomen broad, proportionately massive, transverse at base, the apical margin rounded, entire.

Length, ♀ ♂ 4–4·75; *exp.* 8·5 mm.

Hab. Reported from Calcutta (*teste du Buysson*); spread through the whole of Europe. The above description is taken from a European specimen in the collection of the British Museum.

Genus HEDYCHRUM.

Hedychrum, *Latr. Hist. Nat. Crust. Ins.* iii (1802), p. 317.

Type, *H. nobile*, Scop., from Europe.

Range. Both hemispheres.

♀ ♂. Head transverse, much shorter than the pronotum; occiput transverse, closely approximate to the front of the pronotum; vertex and front convex; facial cavity deep, in all species finely transversely striate; antennæ moderately long, filiform or setaceous; mandibles bidentate or tridentate. Thorax short, massive, broad; in all the Indian species known to me the pronotum is longer than the mesonotum, transverse, almost square, slightly convex above; propleuræ more or less excavate; mesonotum and scutellum gently convex; mesopleuræ convex, triangular, not carinate, the apex not excavate; postscutellum strongly convex, from above more or less semicircular; median segment

suppressed beneath the postscutellum, the posterior lateral angles moderately produced and acute at apex. Wings: fore wing with a complete medial and almost complete 1st submedial cell, the radial and 2nd submedial cells very rudimentary, the 1st discoidal cell outlined by faint, sometimes very faint, brown lines. Legs: the femora and tibiæ normal, the claws of the tarsi bifid at apex. Abdomen pseudosessile, broad, very convex above, rounded posteriorly, the extreme apical margin more or less chitinous, laterally angular or subdentate; the 3rd abdominal segment in all the Indian species very distinctly subapically grooved.

Key to the Species.

a. Facial cavity above not sharply margined.
  a'. Head not broader than front of pronotum, sides of thorax distinctly anteriorly convergent; apical chitinous margin of abdomen medially slightly emarginate .... *H. timidum*, p. 428.
  b'. Head slightly broader than front of pronotum; sides of thorax parallel; apical margin of abdomen not emarginate .... *H. flammulatum*, p. 429.
b. Facial cavity above sharply margined, carinate.......................... *H. lugubre*, p. 430.

509. **Hedychrum timidum**, *Dahlbom, Hym. Eur.* ii (1854), p. 65; *Mosc. Mon. Chrys.* 1889, p. 160.

♀. Green, with a golden effulgence and bluish shades in certain lights, antennæ dark brown, the scape above green, the apex of the tibiæ and the tarsi yellowish brown; head closely reticulate-punctate; thorax coarsely and more sparsely punctured, the punctures on the scutellum and postscutellum larger and farther apart than on the front of the thorax; abdomen finely and closely punctured, the punctures shallow and somewhat larger and more open on the apex of the 2nd and on the 3rd segment; facial cavity transversely finely striate, the upper portion smooth, polished, unpunctured, the sculpture not obscured by any pubescence; pilosity whitish, very short and somewhat sparse. Head short, flat, from occiput to the front about half the length of the pronotum, but quite as broad; clypeus broad, transverse anteriorly, raised a little in the middle; facial cavity comparatively deep, rather narrow, with a shallow broad groove down the middle, its upper margin abruptly rounded, not carinate; front and vertex broad, convex; the occiput sharply transverse; antennæ slender, the 1st and 3rd joints of the flagellum subequal, the 2nd joint twice as long as the 1st. Thorax: the pronotum convex, very long and massive, longer than the mesonotum, the sides convergent anteriorly and with a waved outline; propleuræ excavate; mesonotum short, convex, somewhat transversely rectangular, scutellum convex, subtrapezoidal: mesopleuræ trian-

gular, slightly convex, rugose, the apex beneath subacute; postscutellum large, prominent, strongly convex, overlying the median segment, the posterior lateral angles of which are broadly produced with their apices acute; wings hyaline, a broad fuscous border on the fore wing from the base of the radial cell round the outer margin of the disc; nervures and tegulæ brown. Abdomen very broad and short, strongly convex, the base truncate and slightly emarginate, the apex steeply sloped, the apical margin broadly rounded, with a minute but very distinct tooth on each side.

♂. Identical in colour, smaller, with the sculpture on the abdomen slightly coarser.

Length, ♀ 6, ♂ 5·5; *exp.* ♀ ♂ 12 mm.

Hab. Bengal (*apud Dahlbom*); Punjab, Lahore, Delhi (*Bingham*); Northern Gujerat; Quetta (*Nurse*). I found this species at Delhi around the burrows of a *Bembex* which I failed to capture.

510. **Hedychrum flammulatum**, *Smith, Jour. Linn. Soc.* iii (1859), p. 26. (Pl. I, fig. 5.)

♀. Metallic green, the space round the ocelli, two broad anteriorly convergent bands on the middle of the pronotum, the sides and anterior portion of the medial area on the mesonotum, the middle of the 1st, and the bases, broadly, of the 2nd and 3rd abdominal segments purplish blue, in some specimens the blue is more spread, in others less; antennæ and tarsi black, scape green in front; head and thorax densely punctured, rugose, the facial hollow finely transversely striate, the punctures on the middle of the mesonotum posteriorly, and on the scutellum, postscutellum and median segment large and cribrate; abdomen finely and densely punctured, the punctures shallow; pilosity brownish, fairly abundant. Head subtriangular, broad and slightly convex posteriorly; clypeus moderately broad, subporrect; antennæ cylindrical, 2nd joint of the flagellum the longest; facial hollow deep, with no transverse carina above it, ocelli placed far back on the vertex. Thorax: pro- and mesonotum subequal, convex, transversely rectangular, the sides of the pronotum slightly convergent anteriorly; the scutellum, postscutellum and median segment roundly convex, the posterior lateral angles of the last produced and acute; wings hyaline to fusco-hyaline; legs short, somewhat slender. Abdomen strongly convex, the base transverse with a slight medial impression; the apical margin of the 3rd segment rounded, laterally obscurely angular, subdentate; the preapical series of foveæ moderately well marked, in some specimens distinct, entirely absent in others.

♂. Similar, smaller and a little narrower.

Length, ♀ 6, *exp.* 12; ♂ 5·3, *exp.* 12 mm.

Hab. The Indo-Malayan region.

I found this species parasitic on *Odynerus bipustulatus*, Saussure, but only males were bred out of some nests I had of that wasp.

511. **Hedychrum lugubre**, *Cameron, Mem. Manch. L. Ph. Soc.* xli, (1897), no. 13, p. 6, pl. 16, fig. 10.

♀ ♂. Green: the vertex, the front, the middle of the pronotum and a medial transverse mark on the same posteriorly, the whole base and median area of the mesonotum, the middle of the scutellum, the discs of the 1st and 2nd and the base somewhat narrowly of the 3rd abdominal segment deep blue; antennæ dark brown, the scape in front bright green; legs green, the tarsi reddish brown; head and thorax densely punctured, the punctures subserried and increasing in size on the thorax posteriorly; the abdomen neatly, regularly punctured, the punctures down the middle of the abdomen above markedly smaller than those on the sides; facial cavity densely minutely punctured, rugulose: pilosity very short, abundant, brown. Head as broad as the front of the pronotum, the occiput sharply transverse, the vertex and front convex; the facial cavity deep, sharply margined by a transverse carina above; antennæ short, rather slender; 2nd joint of the flagellum longer than the 3rd. Thorax proportionately broad and massive; pronotum very long, convex above, the sides slightly convergent to the front; mesonotum and scutellum slightly convex; mesopleuræ broad and rugose, somewhat flat: post-scutellum very convex and gibbous; the produced lateral angles of the median segment proportionately large, pointing outwards and acute at apex; wings hyaline, nervures yellowish brown; tegulæ dark brown. Abdomen broad and very convex above, base transverse; apical margin broadly rounded, entire, with a minute tooth on each side, traces of a groove laterally at the apical margin.

Length, ♀ ♂ 4·5; *exp.* ♀ ♂ 6 mm.

Hab. Procured by Mr. Rothney at Barrackpore, Bengal. Type in his collection.

Subfamily CHRYSIDINÆ.

This subfamily contains the bulk of the species of *Chrysididæ*. These vary very much in size, but on the whole are larger than the species of the *Ellampinæ*, from which they are distinguished by the claws of the tarsi being simple and not dentate, the stigmata on median segment being beneath, not above the produced lateral angles of the same, and by the more complete neuration (except in the genus *Chrysogona*) of the fore wing, the 1st discoidal cell being (in Indian species at all events) always complete. As a rule the apical margin of the abdomen is dentate: one section, however, has the margin simply rounded, somewhat as in the *Ellampinæ*, but the abdomen is rarely or never so convex, and the transverse anteapical series of foveæ is more or less always present.

*Key to the Genera**.

a. First discoidal cell in fore wing absent or incomplete	CHRYSOGONA, p. 431.
b. First discoidal cell in fore wing present, complete.	
a'. Of large size, face elongate; sides of head below eyes subparallel and prolonged into somewhat of a beak shape; apical margin of abdomen dentate	STILBUM, p. 432.
b'. Size variable, sides of head not prolonged into a beak shape; apical margin of abdomen entire or dentate or serrate.	
a^2. Apical margin of abdomen with not more than 6 teeth	CHRYSIS, p. 434.
b^2. Apical margin of abdomen serrate, with numerous uneven teeth	EUCHRŒUS, p. 494.

Genus CHRYSOGONA.

Chrysogona, *Förster, Verh. nat. Ver. preuss. Rheinl.* x (1853), p. 327.
Chrysis, pt., *Dahlb. Hym. Eur.* ii (1854), p. 187, pl. x, fig. 105.

Type, *C. gracillima*, Först., from Europe.
Range. Both hemispheres.

♀ ♂. Very close to and resembling the genus *Chrysis*, Linn. Differs chiefly in the neuration of the fore wing, in which the discoidal cells are entirely wanting, or occasionally the 1st discoidal is outlined faintly with brown lines; the costal and medial cells only are complete, the former very narrow; the radial cell is always open at the apex, sometimes very incomplete; the 1st and 2nd submedial cells incomplete, the rest of the cells entirely obsolete; the legs and tarsi are normally constructed, the claws simple. Abdomen very nearly as in *Chrysis*; the transverse anteapical series of foveæ on the 3rd segment very distinct in the Indian species. Only one species has so far been recorded from within our limits.

512. **Chrysogona pumila**, *Klug, Symb. Physic.* pt. 5 (1845) *Ins.*, pl. 45, fig. 13; *Mocs. Mon. Chrys.* 1889, p. 183, pl. i, fig. 38.
Chrysis assimilis, *Dahlb.* (*nec Spinola*), *Hym. Eur.* ii (1854), p. 201.
Chrysogona assimilis, *du Buyss. Jour. Bomb. N. H. Soc.* x (1896), p. 467, pl. ii, fig. 8.

♀. Greenish blue, the discs of the 2nd and 3rd abdominal segments darker blue, on the 2nd almost black; antennæ dusky

* Founded on a table of genera by du Buysson in the Jour. Bomb. N. H Soc. x (1896), p. 467.

black, the scape in front and the basal joint of the flagellum above bluish or greenish; legs green, tarsi reddish brown; head and thorax somewhat densely punctured, the punctures large and small mixed; abdomen more finely, evenly and very closely punctured; facial cavity rugulose, pubescent, the pubescence in part hiding the sculpture; pilosity brownish, short and abundant. Head thick, as broad as or slightly broader than the front of the pronotum; facial cavity deep, above acutely margined, front and vertex proportionately broad and convex; the antennæ thick, the 1st joint of the flagellum small, the 2nd longer than the 3rd, the 3rd and 4th subequal; occiput from above slightly widely emarginate. Thorax: the pronotum short, transversely rectangular; propleuræ excavate; mesonotum and scutellum slightly convex; mesopleuræ rugose, the apex excavate, margined and subacute; postscutellum rounded posteriorly, prominent and convex; posterior lateral angles of median segment moderately broadly produced, acute at apex, slightly curved; wings hyaline, nervures dark brown, tegulæ blue. Abdomen somewhat short and broad, with three wide but shallow impressions at base, the three segments medially longitudinally carinate, the 3rd segment slightly transversely incrassate before the anteapical series, the foveæ comparatively large and open, the apical margin of the 3rd segment sinuate, laterally bidentate.

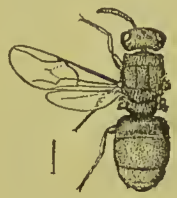

Fig. 150.
Chrysogona pumila, ♀.

♂. Similar. The one I have seen slightly broader and shorter.

Length, ♀ 3·75; ♂ 3·5; *exp.* ♀ ♂ 6 mm.

Hab. Within our limits recorded from Bombay, Poona (*Wroughton*). Found in Southern Europe, Northern Africa, and Persia.

I have taken the above description from a specimen from Spain, in the British Museum Collection. According to Mocsáry, the apical margin of the 3rd abdominal segment is variable.

Genus STILBUM.

Stilbum, *Spinola, Ins. Lig.* i (1806), p. 9.

Type, *S. cyanurum*, Först., from Europe.

Range. Both hemispheres.

♀ ♂. Head much narrower than the pronotum, very short, the occiput more or less rounded, the vertex and front convex, very narrow, the eyes occupying more than two-thirds of the whole width of the face; the sides of the head and the cheeks elongate, the mandibles produced somewhat into the shape of a beak; the clypeus also produced, anteriorly medially emarginate; facial hollow deep, transversely striate, above not margined; antennæ

moderately long and thick; eyes large, oval; ocelli well developed, the anterior ocellus placed in a hollow. Thorax massive, the pronotum concave anteriorly, the sides strongly convergent, the anterior lateral angles of the prothorax prominent; propleuræ proportionately larger in the ♂ than in the ♀, excavate; mesonotum and scutellum convex; mesopleuræ broadly longitudinally grooved, the margin anteriorly and the apical area depressed, the latter bidentate; the upper tooth broad, rounded at apex, the lower tooth narrower and more acute; scutellum gibbous, with a medial little hollow at base; postscutellum suppressed under the scutellum, but from its base a large mucro, hollow above, projects backwards. Wings ample: fore wing with the costal, medial and long 1st discoidal cell complete, the 1st and 2nd submedial almost complete, the radial cell open for its apical third; hind wing nervures present, but cells all unformed. Abdomen massive, transverse at base; the sides convergent posteriorly, the anterior lateral angles broadly truncate, the truncate portion widely but slightly emarginate, making the extreme anterior lateral angles of the 1st segment rather prominent, the sides of the 1st and of the 2nd segment at base laterally flattened; the abdomen above convex, the 2nd segment indistinctly medially longitudinally carinate; the 3rd segment deeply depressed along the base, strongly transversely incrassate before the well-marked anteapical series of foveæ; the apical area ample, the apical margin with 4 subequal large triangular teeth, the medial two slightly advanced and closer to each other than either is to the next tooth on the outside.

The genus contains but one species with three well-marked varieties, of which two are found within our limits.

513. **Stilbum cyanurum**, *Först.* (Chrysis) *Nov. Spec. Ins.* 1771, p. 89; *Mocs. Mon. Chrys.* 1889, p. 190, pl. 2, figs. 3, 4 & 16. (Pl. I, fig. 6.)

Chrysis amethystina, *Fabr. Syst. Ent.* (1775), p. 359; *du Buyss.* (Stilbum) *Jour. Bomb. N. H. Soc.* x (1896), p. 478.

Stilbum splendidum, *Spinola, Ins. Lig.* i (1806), p. 9; *du Buyss. Jour. Bomb. N. H. Soc.* x (1896), p. 478, pl. iii, figs. 9–12, pl. iv, figs. 1–4, & pl. v, fig. 8.

Fig. 151.—*Stilbum cyanurum*, var. *splendidum*, head and thorax, ♀.

True *S. cyanurum*, Först., does not, so far as I know, occur within our limits.

Var. *splendidum*, Fabr. ♀. Metallic green, the 3rd abdominal segment purple; the occiput, medial area of mesonotum, and the 1st and 2nd abdominal segments more or

less metallic blue in certain lights; head and thorax very densely coarsely punctured, cribrate; abdomen much more sparsely but quite as coarsely punctured; the punctures on the thorax posteriorly serried and reticulate, on the abdomen, towards apex finer and shallower. ♂ similar, much smaller.

Var. *amethystinum*, Fabr. ♀. Metallic green, much shaded with blue to entirely metallic blue; the sculpture similar. ♂ similar to the ♀, but smaller.

For the rest, for both varieties, see the generic characters.

Length, ♀ 12–16, ♂ 9–12; *exp.* ♀ 21–26, ♂ 16–20 mm.

Hab. Throughout our limits and apparently spread all over the world. No hard-and-fast line separates the habitats of the two above varieties, but var. *amethystinum* is commoner in Sikhim and in the countries east of the Bay of Bengal, where the rainfall is very heavy, than var. *splendidum*.

I have bred var. *amethystinum* from the nests of *Megachile fraterna*, Smith, *Megachile monticola*, Smith, and *Eumenes petiolata*, Fabr.

Genus CHRYSIS.

Chrysis, *Linn. Syst. Nat.* ed. 12 (1767), p. 947.
Pyria, *Lepel. & Serv. Encycl. Méth.* x (1825), p. 494.

Type, *C. cyanea*, Linn., from Europe.

Range. Both hemispheres.

♀. The head varies in shape, triangular or subtriangular, rounded and convex above, occasionally it is globose, sometimes broader than long, rarely quadrate; mandibles pointed at apex or bidentate; clypeus generally broad, often subporrect in the middle or emarginate anteriorly; the face up to the front below the anterior ocellus and between the eyes is generally hollow, forming a facial cavity in which the antennæ when folded rest; antennæ ♀ and ♂ simple, generally cylindrical; scape moderately long; front more or less convex, sometimes slightly hollow round the anterior ocellus; ocelli always present; eyes proportionately rather large, lateral; cheeks below and the sides of the head behind the eyes generally short and restricted; vertex more or less convex; occiput transverse or emarginate, occasionally rounded. Thorax: the prothorax short or moderately long, the posterior lateral angles prolonged slightly towards the base of the wings; the pronotum above more or less transversely rectangular, convex, the sides parallel or slightly convergent anteriorly; propleuræ generally more or less excavate; mesonotum and scutellum distinct; mesopleuræ generally rugose, very often obliquely grooved, the groove formed by foveate distinct depressions; the apex acute or rounded, sometimes bidentate, often excavate and margined; postscutellum well developed, most often convex, rounded posteriorly, sometimes with a mucro projecting backwards from base; median segment always more or less suppressed beneath the post-

scutellum, the posterior lateral angles always produced, flattened and usually acute at apex. Wings with few nervures and cells; in the fore wing the costal, the medial and 1st discoidal cells are complete, the 1st submedial and radial cells sometimes complete, sometimes incomplete, the 2nd submedial and the 1st cubital incomplete, the costal cell is always very narrow, almost obliterated, and the 1st cubital generally entirely open at the apex, rarely the transverse cubital nervure closing it is faintly outlined; in the hind wing the neuration is still more incomplete, mere vestiges of cells and nervures being faintly outlined. Legs feeble, unarmed; femora and tibiæ normal; claws simple, not dentate. Abdomen pseudosessile, more or less convex above, very variable in proportion of length to breadth; the sides may be parallel or convergent posteriorly; the base concave, transverse, or with one or more impressions above; 2nd segment generally the longest, very often medially longitudinally carinate; 3rd segment often transversely incrassate in the middle, with an anteapical row of foveæ present as a rule, exceptionally absent or obliterated; apical margin with or without teeth, the latter, when present, vary in number in Indian species from 2 to 6.

The species of this genus are parasitic on fossorial and other Hymenoptera. One species, *C. shanghaiensis*, Smith, has been reared from the cocoons of a moth (*Monema flavescens*, Walk.); but it occurs to me that this is probably a case of double parasitism, the *Chrysis* being parasitic on an Ichneumon, itself a parasite of the moth.

Key to the Species.

A. Apical margin of abdomen without teeth.
- *a*. Abdomen without any cupreous or golden effulgence.
  - a'. Head broader than front margin of pronotum.
    - a^2. Apical margin of abdomen with a very narrow white chitinous border ...... *C. hedychroides*, [p. 440.
    - b^2. Apical margin of abdomen without any such border.
      - a^3. Facial cavity shallow, not margined above; front without a transverse carina.
        - a^4. Apical margin of abdomen narrowly arched, continuous with sides .... *C. nila*, p. 441.
        - b^4. Apical margin of abdomen not arched, forming rounded but distinct angles with sides .... *C. kashmiriensis*, [p. 441.
      - b^3. Facial cavity deep, margined above; front with a transverse carina .... *C. burmanica*, p. 442.
  - b'. Head not broader than front margin of pronotum.
    - a^2. Apical margin of abdomen not sinuate. *C. wroughtoni*, p. 443.
    - b^2. Apical margin of abdomen trisinuate.. *C. quærita*, p. 444.

Abdomen with more or less of cupreous or golden effulgence.
- *a'*. Apical margin of abdomen sinuate.
  - *a²*. Pronotum and scutellum cupreous golden .... *C. bayadera*, p. 444.
  - *b²*. Pronotum and scutellum dark blue .. *C. charanæ*, p. 445.
- *b'*. Apical margin of abdomen not sinuate.
  - *a²*. Punctures on head and thorax very fine, serried, coriaceous.
    - *a³*. A distinct carina behind anterior ocellus .... *C. ignifascia*, p. 445.
    - *b³*. No carina behind anterior ocellus .. *C. abuensis*, p. 446.
  - *b²*. Punctures on head and thorax not fine, serried, or coriaceous.
    - *a³*. Sides only of 1st and apical margin of 2nd abdominal segment with a light golden effulgence; length 5·5 mm. .... *C. dissimilanda*, [p. 447.
    - *b³*. Whole of 1st (except extreme base and narrow medial line) and apical two-thirds of 2nd abdominal segment cupreous golden; length 6·6–9 mm. .... *C. jalala*, p. 447.

B. Apical margin of abdomen with 2 teeth.
- *a*. The teeth medial, close together .... *C. elizabethæ*, p. 449.
- *b*. The teeth not medial, not close together, placed at posterior lateral angles of abdomen. *C. furiosa*, p. 448.

C. Apical margin of abdomen with 3 teeth.
- *a*. Apical margin of abdomen more or less transverse, lateral tooth on each side placed at the posterior lateral angles.
  - *a'*. Apical area of 3rd abdominal segment brown, translucent, chitinous; length 12 mm. .... *C. nugatrix*, p. 450.
  - *b'*. Apical area of 3rd abdominal segment green, not translucent nor chitinous; length under 8 mm.
    - *a²*. Apical margin of abdomen between lateral and medial teeth sinuate .... *C. mendicalis*, p. 451.
    - *b²*. Apical margin of abdomen between lateral and medial teeth not sinuate, straight.
      - *a³*. Head thick, more than twice as long as pronotum; species very slender and small, length 3·5 mm. ...... *C. lanka*, p. 451.
      - *b³*. Head not so thick, a little longer only than pronotum; species larger and more robustly built, length over 6 mm.
        - *a⁴*. Occiput transverse .... *C. triacantha*, p. 453.
        - *b⁴*. Occiput widely emarginate.
          - *a⁵*. Second abdominal segment medially longitudinally strongly carinate .... *C. singalensis*, p. 453.
          - *b⁵*. Second abdominal segment not carinate .... *C. scioensis*, p. 454.
- *b*. Apical margin of abdomen completely rounded, with the three small acute teeth placed in middle .... *C. paria*, p. 455.

D. Apical margin of abdomen with 4 teeth.
- *a*. Wings hyaline.
  - *a'*. Apical abdominal teeth very uneven; medial pair obtuse, advanced; lateral acute, not advanced . . . . *C. autocrata*, p. 456.
  - *b'*. Apical abdominal teeth more regular, none obtuse nor advanced much beyond the others.
    - *a*². Second joint of flagellum of antennæ the longest.
      - *a*³. Abdomen with more or less of a cupreous or golden effulgence.
        - *a*⁴. Entire abdomen golden green, with a cupreous effulgence . . . . *C. gujaratica* ♀, [p. 456.
        - *b*⁴. Abdomen only cupreous or golden in part.
          - *a*⁵. Basal 2 segments and basal area of 3rd deep cupreous red . . . . *C. annulata* ♀, [p. 457.
          - *b*⁵. Basal 2 segments cupreous golden red . . . . *C. apiata*, p. 458.
          - *c*⁵. Apical margins only of basal 2 segments cupreous red . . . . . . *C. greeni*, p. 459.
      - *b*³. Abdomen green or bluish green, without cupreous or golden effulgence.
        - *a*⁴. Anteapical series of foveæ very indistinct, obsolete . . . . *C. obliterata*, p. 460.
        - *b*⁴. Anteapical series of foveæ more distinct, rounded or oval, open.
          - *a*⁵. Stoutly built; pronotum long, massive, longer than head; length 7–9 mm. . . . . *C. gujaratica* ♂, [p. 456.
          - *b*⁵. More slenderly built; pronotum distinctly shorter than head; length under 7 mm.
            - *a*⁶. Medial two teeth on apical margin longer than lateral two . . . . *G. disparilis*, p. 461.
            - *a*⁶. Medial and lateral teeth on apical margin of abdomen subequal . . . . *C. thalia*, p. 462.
    - *b*². Third joint of flagellum of antennæ the longest.
      - *a*³. Second and third abdominal segments with a cupreous golden effulgence . *C. nursei*, p. 463.
      - *b*³. Second and third abdominal segments entirely without or with spots only of cupreous golden effulgence.
        - *a*⁴. Thorax and abdomen entirely green. *C. gracilenta*, p. 464.
        - *b*⁴. Lateral areas of mesonotum, sides of 1st and 2 spots laterally on 2nd and 3rd abdominal segments cupreous golden . . . . *C. speculata*, p. 465.
    - *c*². Fourth joint of flagellum of antennæ the longest . . . . *C. annulata* ♂, [p. 457.
- *b*. Wings more or less fuscous.
  - *a'*. Abdomen entirely deep cupreous or ruby-red, shaded with blue on discs of segments . . . . *C. cupreiventris*, [p. 465.

b'. Abdomen more or less blue or green.

a^2. Sides and apical margins of two basal segments cupreous golden .... *C. sandaracata*, [p. 466.

b^2. Abdomen without any cupreous or golden effulgence.

a^3. Head narrower than pronotum; anterior ocellus placed in a hollow . *C. fuscipennis*, p. 467.

b^3. Head as broad as pronotum or broader.

a^4. Apical abdominal teeth remarkably broad and obtuse.

a^5. No transverse carina on front.

a^6. Medial two teeth closer to one another than either is to the tooth next to it exteriorly .. *C. angustata*, p. 469.

b^6. All four teeth equidistant .. *C. cotesi*, p. 470.

b^5. A transverse carina on front.... *C. perfecta*, p. 471.

b^4. Apical abdominal teeth acute.

a^5. Medial two teeth longer than lateral teeth.

a^6. Anterior ocellus with a carina on each side .... *C. bhavanæ*, p. 472.

b^6. Anterior ocellus without carinæ at the sides .... *C. bahadur*, p. 473.

b^5. Medial two teeth not longer than lateral teeth.

a^6. Punctures on 1st abdominal segment coarser than on 2nd.

a^7. Facial cavity transversely and sharply margined above by a carina; length 10-11 mm. *C. conserta*, p. 474.

b^7. Facial cavity not margined above, sinuate, a transverse carina above it on front, not along margin; length 6 mm. .... *C. saraksensis*, p. 475.

b^6. Punctures on 1st abdominal segment not coarser than on 2nd.

a^7. Anterior lateral angles of pronotum seen from above distinctly truncate ...... *C. indogotea*, p. 475.

b^7. Anterior lateral angles of pronotum seen from above sharply prominent, not truncate................ *C. ionophris*, p. 476.

E. Apical margin of abdomen with 5 teeth.

a. Postscutellum furnished at base with a broad mucro .... *C. shanghaiensis*, [p. 477.

b. Postscutellum without mucro.

a. Outer emarginations on apical border of abdomen distinctly broader than medial emarginations.

a'. Anteapical series obsolete .... *C. libita*, p. 478.

b'. Anteapical series not obsolete, well-marked.

a^2. Teeth on apical margin of abdomen acute, triangular, subequal: head and thorax above and sides of abdomen aëneous purple.............. *C. imperiosa*, p. 479.

b^2. Teeth on apical margin of abdomen not all acute, nor triangular nor subequal; head, thorax and abdomen differently coloured.

a^3. Median tooth short obtuse, 2 outer teeth on each side acute.

a^4. Two outer teeth on each side spinose, equal; 1st abdominal segment with a lateral cupreous golden spot near apical margin . *C. furcifera*, p. 480.

b^4. Two outer teeth on each side subtriangular, unequal, the outer the shorter; 1st abdominal segment without lateral golden spot, 2nd segment lightly golden along apical margin.......... *C. amœnula*, p. 481.

b^3. Three median teeth obtuse, outer tooth on each side acute.

a^4. Abdomen above densely and coarsely punctured, apical margins of 1st and 2nd segments with a golden-green lateral spot, 3rd segment entirely deep blue .... *C. bengalensis*, p. 482.

b^4. Abdomen above minutely and very densely punctured, a narrow band on apical margins of 1st and 2nd and on apical margin of basal area of 3rd segment cupreous .... *C. danaë*, p. 483.

b. Outer and medial emarginations on apical border of abdomen equal .... *C. lusca*, p. 484.

F. Apical margin of abdomen with 6 teeth.

a. Postscutellum furnished at base with a mucro.

a'. Two medial teeth on apical margin of abdomen closer to each other than either is to the tooth next to it exteriorly; a deep blue lateral spot at base of 2nd abdominal segment .... *C. orientalis*, p. 485.

b'. Two medial teeth on apical margin of abdomen not closer to each other than to the tooth next to each exteriorly; no blue lateral spot at base of 2nd abdominal segment........................... *C. indica*, p. 486.

b. Postscutellum without mucro.

a'. Length under 8 mm.

a^2. Abdomen finely punctured, disc of 1st segment almost smooth .... *C. arrestans*, p. 487.

b^2. Abdomen punctured all over; large coarse punctures few and scattered, the interspace very finely and densely punctured .... *C. durga*, p. 487.

b'. Length over 9 mm.

a^2. Second abdominal segment with two large cupreous lateral spots at apical margin.

a^3. Second joint of flagellum of antennæ very much shorter than 3rd joint .. *C. oculata*, p. 488.

b^3. Second joint of flagellum of antennæ equal to 3rd joint or longer ...... *C. schioedtei*, p. 489.

b^2. Second abdominal segment without any cupreous-red lateral spots at apical margin.

a^3. Second joint of flagellum of antennæ longer than 3rd joint.

a^4. Pronotum bearing a medial longitudinal impression.

a^5. Pro- and mesonotum covered with very coarse dense serried punctures .... *C. principalis*, p. 490.

b^5. Pro- and mesonotum in part with coarse, scattered not serried punctures .... *C. comottii*, p. 491.

b^4. Pronotum without a medial longitudinal impression .... *C. feana*, p. 491.

b^3. Second joint of flagellum of antennæ remarkably short, much shorter than 3rd joint .... *C. obscura*, p. 492.

514. **Chrysis hedychroides**, sp. nov.

♀. Light metallic green, the thorax and abdomen where the surface is rubbed coppery, antennæ brown, the scape and basal joint of the flagellum above green, legs green, tarsi brownish yellow; head, thorax (the postscutellum excepted) and abdomen minutely and very densely punctured; on the head and thorax the punctures run into reticulations giving a finely granulate appearance to those parts, on the abdomen they are distinct, not granulate; postscutellum with large shallow and serried punctures, a few similar punctures mixed with the finer ones on the scutellum and mesonotum posteriorly; facial cavity minutely punctured like the rest of the head; pilosity brownish yellow, long, soft and abundant on the head and thorax, almost entirely wanting on the abdomen. Head broad, broader than the thorax, much broader than long, strongly constricted anteriorly, occiput transverse, vertex and front broad, convex; facial cavity nearly obsolete, the face merely slightly depressed inwards towards a short medial longitudinally impressed line; antennæ short, slender, 3rd joint of the flagellum the longest; clypeus slightly emarginate anteriorly; eyes very large and prominent. Thorax short and broad: the pronotum short, transverse, medially impressed in front, the sides convergent anteriorly, propleuræ slightly hollow, the mesonotum nearly flat, the scutellum and postscutellum convex, with a somewhat steep slope posteriorly; mesopleuræ strongly convex, the apex not acute, rounded, excavate, smooth and margined by a sharp carina; produced posterior lateral angles of the median segment small, very narrow, curved and acute at apex; wings hyaline, nervures light brown, tegulæ green. Abdomen proportionately very broad at base, very convex above, the sides very convergent posteriorly, the apical margin entire, narrowly rounded, the extreme border very narrowly chitinous, white, the anteapical series not

very distinct, with 8 foveæ, the base of the 1st segment slightly concave, the 2nd segment with a medial longitudinal slight carina.

♂ unknown.

Length, ♀ 5·5; *exp.* 11 mm.

Hab. Procured at Pishin, Baluchistan (*Nurse*).

515. **Chrysis nila**, sp. nov.

♂. Head, greater part of thorax, and the basal abdominal segment dingy bluish green; the space round the ocelli, the mesonotum and the apical two abdominal segments black, purplish in certain lights, with the apical margins of the latter green; antennæ dark brown; legs, the coxæ and femora purplish black, the tibiæ and tarsi dark brown; head and thorax finely punctured, slightly, very finely granulate; facial hollow and abdomen minutely punctured, the punctures shallow, not giving a granulate appearance; pilosity brownish, fairly abundant. Head thick, broad, longer and broader than the pronotum, constricted anteriorly, the occiput somewhat sharply transverse, the front and vertex broad and slightly convex; the facial hollow almost obsolete, the face only slightly concave and medially longitudinally grooved; antennæ long and slender, the 2nd joint of the flagellum very little longer than the 3rd; the cheeks and mandibles long, the latter bidentate at apex. Thorax: the pronotum long, nearly as long as broad, the sides parallel; propleuræ not excavate, the sides of the prothorax slightly concave; mesonotum and scutellum slightly convex; mesopleuræ slightly convex, rugulose, the triangular apex beneath separated from the upper portion by a deep groove; postscutellum convex; the produced posterior lateral angles of the median segment rather long, narrow, acute at apex and curved backwards; wings hyaline, iridescent, the nervures and tegulæ dark brown. Abdomen convex, moderately long, the 1st segment transverse at base, slightly impressed in the middle above, the 2nd segment not carinate, the 3rd segment has the sides continuous with the margin, forming a narrow arch, the latter entire, not dentate; anteapical series very close to the margin, not very distinct, the foveæ small, punctiform.

♀ unknown.

Length, ♂ barely 5; *exp.* 8 mm.

Hab. Northern Gujerat, Deesa (*Nurse*).

516. **Chrysis kashmirensis**, *Nurse, Entomologist*, xxxv (1902), p. 307.

♀. Uniform greenish blue, in certain lights more blue than green; the median area of the mesonotum and the scutellum deep ultramarine-blue; antennæ brown, the scape in front and the basal two joints of the flagellum above green; legs green; tarsi brown; head and thorax rugose, very densely punctured, the punctures irregular in part, cribrate and within finely punctured: abdomen rather more finely and less densely punctured, the punctures shallow, with a mixture of larger and deeper punctures;

facial cavity as coarsely punctured as the head and front above it; pilosity brownish, long and plentiful on the head, thorax and towards the apex of the abdomen, almost wanting on the basal two segments of the last. Head broader than the pronotum and quite as long; facial cavity very shallow, the face barely depressed; clypeus produced, its anterior margin sharply transverse; antennæ long and thick, the 2nd joint of the flagellum three times as long as the 1st and twice as long as the 2nd; front and vertex very broad, with a slight rounded slope to the front; occiput slightly emarginate; the sides of the head behind the eyes broad. Thorax: the pronotum transversely rectangular, the sides very slightly emarginate; the anterior margin rounded, not sharp; a rounded depression in the middle above; propleuræ depressed, with two slight hollows; mesonotum, scutellum and postscutellum convex, the sutures between them deep and broad, the median area of the mesonotum somewhat narrow, longitudinally rectangular; mesopleuræ rugose, with a broad longitudinal groove from under the wings terminating in a short transverse pre-apical groove, the apex beneath triangular; postscutellum rounded, not prominent, median segment vertical, its posterior lateral angles broadly produced and acute; wings hyaline, nervures dark brown, tegulæ purple; legs long and somewhat slender. Abdomen as long as the head and thorax united, the base more or less truncate, the three segments indistinctly medially longitudinally carinate, the sides of the 3rd segment slightly convergent posteriorly, the apical margin straight, entire, the anteapical series not deep, the foveæ small.

Length, ♀ 9–10; *exp*. 16–17 mm.

Hab. Kashmir, 5000–6000 ft. (*Nurse*).

517. **Chrysis burmanica,** *Mocsáry, Termész. Füzetek,* xv (1892), p. 214.

♂. Closely resembles *C. ignifascia*, Mocs., but differs in colour and somewhat in sculpture. Dark blue, with greenish tints in certain lights, arising from the punctures being greenish inside; the margin of the head and pronotum posteriorly, the posterior angles of the median segment, the base of the abdomen, the apical margin of the 1st and 2nd, and preapical band on the 3rd abdominal segment decidedly green; the space round the ocelli, some marks on the pronotum, the medial area of the mesonotum, the base of the 2nd and 3rd abdominal segments, and the apical margin of the latter segment black or partially very dark blue; antennæ and legs dusky black; the scape of the antennæ in front, the basal two joints of the flagellum above, the coxæ, trochanters, femora and tibiæ of the legs green; pilosity as in *C. ignifascia*, but the whitish hairs in the facial hollow and on the legs softer, more dense and not so oblique. Puncturing as in *C. ignifascia* but finer, shallower and more regular on the abdomen. Head subglobose; mandibles, clypeus, antennæ and frontal carina as in *C. ignifascia*. Thorax similar to the thorax in that species, but

the median segment posteriorly somewhat truncate ; wings slightly more fuscous ; abdomen also similar, but the 1st segment with a short broad longitudinal furrow at base and the 3rd segment as well as the 2nd medially longitudinally carinate.

Length, ♂ 6·5 ; *exp.* 13 mm.

Hab. Upper Burma, Bhamo (*Fea*) ; Mandalay (*Bingham*) ; Lower Burma, Pegu (*Allan*).

I am very doubtful, notwithstanding the striking difference in colour and slight difference in sculpture, whether this species is not the ♂ of *C. ignifascia*. The description of both species has been taken from the types kindly lent me by Dr. Gestro, of the Genoa Museum ; but the two males of *C. burmanica* in my own collection are much greener than the type of that species, and one of them makes an approach to the brilliant colouring of *C. ignifascia*, as it has the apical margin of the 2nd abdominal segment a decidedly yellow golden-green.

518. **Chrysis wroughtoni**, *du Buysson, Jour. Bomb. N. H. Soc.* x (1896), p. 469, ♀, pl. iii, fig. 2, & pl. v, fig. 7.

"♀. Body narrow, elongate, subparallel, entirely blue or bluish green, with some parts more blue ; the scutellum and post-scutellum fiery golden ; pubescence fine reddish grey. Head not broader than the pronotum, thick, rounded, with serried moderately large punctures, running into reticulations on the front ; facial cavity greener, wide, more finely punctured, terminated above by a transverse carina, roundly arched near the eyes ; cheeks very short ; antennæ blackish brown, the 1st three joints blue, the 3rd twice as long as the 4th. Pronotum subcylindrical, punctures on the thorax moderately deep, serried, subreticulate, those on the metathorax large and reticulate ; the posterior lateral angles of the metathorax acute, recurved at apex. Tegulæ blue, rather chitinous ; wings subhyaline, nervures reddish testaceous, legs green, tarsi brownish. Abdomen elongate, subcylindrical, lightly carinate ; punctures moderately large, somewhat serried, subreticulate ; posterior lateral angles of the 2nd segment rounded : 3rd segment regular, convex, with large coarse punctures ; ante-apical series obsoletely hollow, with 10 moderate-sized foveæ, round, open, separate one from the other ; apical margin long, even, entire, with a subchitinous narrow border, protruding in such a manner as to form a sinus with the sides of the segment, which are convergent posteriorly. Ventral side of the abdomen with black spots.

"*Length*, ♀ 6–7 mm.

"*Hab.* Recorded from Bombay Presidency, Poona (*Wroughton*).

"This species probably has the antennæ, nervures of the wings and tarsi reddish." (*du Buysson.*)

519. **Chrysis quærita,** *Nurse, Entomologist,* xxxv (1902), p. 307, ♂.

"♂. Rather stoutly built; head, thorax and abdomen closely, but not very finely punctured, and covered with a short, sparse, greyish pubescence; head about as wide as pronotum, and, when viewed from above, subequal to it; abdomen not quite so long as head and thorax united; vertex overhanging the front, but with no distinct ridge between them; front concave, finely and closely punctured, and with stiff somewhat sparse white pubescence; pronotum with a median longitudinal depression; 3rd abdominal segment trisinuate, with subapical foveæ. Dark blue, with a greenish tint in some lights; front and scutellum light green; mandibles, antennæ and tarsi black; wings hyaline, the radial cell subfuscous and closed.

"*Length,* ♂ 6 mm.

"*Hab.* Deesa; a single example." (*Nurse.*)

520. **Chrysis bayadera,** *du Buysson, Jour. Bomb. H. N. Soc.* x (1896), pp. 469 & 470; pl. ii, fig. 15; pl. iii, figs. 1, 3; pl. v, fig. 6.

"♂. Body narrow, subparallel, entirely bright green or bright blue, with the vertex, the median area of the mesonotum, the base of the 2nd, and the whole of the 3rd abdominal segment deep blue, at times becoming blackish blue; the pronotum, the scutellum, and the apical half of the 2nd abdominal segment fiery golden. Pubescence white, fine. Head thick, rounded; facial cavity golden green, narrow, finely punctured, covered with white hairs, margined above by traces of a transverse carina; cheeks moderate, converging anteriorly; antennæ maroon, the first two joints greenish bronze, the 3rd a little longer than the 4th. Punctures on the body anteriorly of moderate size, serried, close together, subcoriaceous, mixed with finer punctures; pronotum subcylindrical; postscutellum with the anterior suture open, gaping; the posterior lateral angles of the metathorax triangular, the apex obtuse, straight. Tegulæ maroon colour, wings slightly fuscous; legs green, tarsi reddish maroon. Abdomen wide, slightly carinate, a little depressed; the punctures moderate, serried, subcoriaceous, irregular, mixed with finer punctures, the posterior lateral angles of the 2nd segment rounded; 3rd segment regularly convex, the sides straight and continuous with those of the apical margin; series anteapical very slightly hollow; 12 small foveæ, subtransverse, open, subconfluent; the apical margin short, slightly sinuate at apex. Abdomen beneath marked with black.

"♀. Differs from the ♂ by being brighter coloured, the cheeks long, the 3rd joint of the antennæ longer, colour blue; the 3rd abdominal segment more elongate, and the abdomen beneath blue." (*du Buysson.*)

Length, ♀ ♂ "7–8 mm."

Hab. Central Provinces; Poona (*Wroughton*).

Unknown to me.

521. Chrysis chavanæ, *Nurse, Entomologist*, xxxv (1902), p. 308, ♀.

"♀. Head and thorax closely but somewhat irregularly, abdomen rather more regularly and finely punctured; head wider than pronotum, the latter with sides almost parallel; 1st abdominal segment with a deep median longitudinal indentation at base, 2nd and 3rd segments with traces of a carina, apical segment without teeth, slightly sinuate. Head and thorax dark blue, the mesonotum with greenish reflections; abdomen light metallic green, with a coppery effulgence on 2nd and 3rd segments; legs dark blue, flagellum of antennæ piceous; tarsi dark red or reddish black; the whole insect more or less covered with rather sparse greyish pubescence; wings hyaline, fore wing with the central portion very slightly infuscated, nervures dark testaceous.

"*Length*, ♀ 6 mm.

"*Hab.* Quetta; a single specimen." (*Nurse.*)

522. Chrysis ignifascia, *Mocsáry, Termész. Füzetek*, xv (1892), p. 215.

♀. Dark metallic green: the space round the ocelli, a medial transverse mark on the occiput, another similar mark on the front of the pronotum, the medial area, the lateral margins and the tegulæ of the wings on the mesonotum, and the base broadly of the 2nd and 3rd abdominal segments dark bluish black, on the 2nd abdominal segment the blue reaches medially further towards the margin than it does at the sides and is bordered with greenish, beyond which the remainder of the segment is brilliant fiery ruby-coloured; antennæ black, the scape in front and the basal two joints of the flagellum above green; legs, including the tibiæ and 1st joint of the tarsus on the upper side green, the tibiæ below and the rest of the tarsi dark brown; head, thorax and abdomen evenly, rather coarsely and very densely punctured all over; the facial hollow finely, transversely striate; pilosity rather abundant, dark and very short; on the legs and in the facial hollow on either side there is a little rather long, oblique, white pubescence. Head subglobose, somewhat broader than long, mandibles bidentate; clypeus transverse, flat; antennæ short and moderately thick, the 2nd joint of the flagellum twice as long as the 3rd; below the anterior ocellus, but appreciably above the upper margin of the facial hollow, the front is crossed by a transverse deeply bi-waved carina. Thorax: the pronotum transverse, only a little shorter than the mesonotum, the sides slightly converging towards the front; mesonotum convex, the medial area rectangular; mesopleuræ excavate anteriorly, the hollow flat, coarsely punctured and margined, coming to a point beneath, posteriorly the mesopleuræ are finely punctured; scutellum, post-scutellum and median segment together rounded, forming one convexity, the posterior lateral angles of the median segment flattened and produced; wings hyaline, slightly fuscous, nervures brown; legs comparatively long. Abdomen subcylindrical above,

the 2nd segment medially longitudinally carinate; the apical margin of the 3rd segment entire, broadly rounded, with an anteapical series of 14 to 16 foveæ.

Length, ♀ 6·5; *exp.* 12·5 mm.

Hab. Recorded so far only from Lower Burma, Palon near Rangoon (*Fea*). See, however, the remarks under *C. burmanica*, Moes. (*ante*, p. 443).

523. **Chrysis abuensis**, *Nurse, Entomologist*, xxxv (1902), p. 307, ♀ ♂. (Pl. I, fig. 10.)

♀. The face and head in front, the pronotum, the lateral areas of the mesonotum, the mesopleuræ, the legs, the disc of the 1st abdominal segment, the apical margins of the 2nd and of the basal area of the 3rd segment, light metallic green; the head posteriorly, the prothorax in front, two crescentric marks on the disc of the pronotum, the propleuræ, the median area of the mesonotum, the median segment, the basal face of the 1st abdominal segment and the basal portions broadly of the 2nd and 3rd segments, deep metallic blue; the medial portion broadly of the scutellum cupreous red, and of the postscutellum cupreous red bordered posteriorly with golden, the sides of the 1st abdominal segment also cupreous red bordered with golden; head, thorax and abdomen very densely and finely punctured, granulate on the head and thorax, the punctures more shallow on the abdomen, on the scutellum and postscutellum they are slightly larger but not coarse as in many species; facial hollow minutely punctate, rugulose, towards the upper margin slightly more coarsely punctured, reticulate; pilosity brownish, very short and somewhat sparse; the facial hollow without the usual long whitish pubescence. Head flat, transverse, as broad as the pronotum but not quite so long; clypeus broad, convex, and slightly incised in the middle anteriorly; facial hollow rather shallow, margined above by a ⌒-shaped carina; front and vertex broad, convex, the occiput transverse; the sides of the head behind the eyes broad; antennæ as in *C. gujaratica*. Thorax: the pronotum long, transversely rectangular, the sides very slightly convergent anteriorly; propleuræ excavate; mesonotum and scutellum gently convex, the median area on the mesonotum rather narrow, a little more than twice as long as broad; mesopleuræ flat, with the anterior and apical portions slightly depressed, the former bounded by an oblique carina posteriorly; postscutellum very convex; median segment with a wide semicircular depression on its posterior face, formed by foveæ divided by carinæ; posterior lateral angles produced, and somewhat short and thick; wings hyaline, slightly fuscous; nervures brown, tegulæ purple; legs stout and long. Abdomen as long as the head and thorax united, subcylindrical, the base concave; the 2nd and 3rd segments medially obsoletely carinate; the anteapical series of foveæ on the latter small, not very distinct: apical margin of segment roundly arched, entire, and without teeth.

♂. Identical with the ♀ in form and sculpture. Differs only in color, the scutellum being bright golden, the postscutellum and sides of the 1st abdominal segment golden green, the posterior lateral angles of the median segment deep blue like the rest of the segment; the colour of the rest of the parts is similar to that in the ♀.

Length, ♀ ♂ 9·5–10; *exp.* ♀ ♂ 18 mm.

Hab. Recorded so far only from Mount Abu, 4000 ft., in Rajputana (*Nurse*).

524. **Chrysis dissimilanda**, *du Buysson, Jour. Bomb. N. H. Soc.* x (1896), pp. 469 & 470.

"♀. Similar to *C. bayadera*, from which it differs in colour, not showing any of the fiery golden tint, a light golden effulgence only on the apical margin of the 2nd abdominal segment. The punctures on the anterior portion of the body are not rugose nor very serried and close; the face wide, not constricted at the base, the cheeks scarcely developed at all; pronotum shorter and more convex, the posterior lateral angles of the metathorax very small and scarcely produced, obtuse; the tarsi subtestaceous; the 3rd abdominal segment evenly rounded at apex, not sinuate. Ventral side of abdomen bright green, with two dark blue spots on the 2nd segment.

"*Length*, 5·5 mm.

"*Hab.* Bombay, Poona (*Wroughton*)." (*du Buysson.*)

This species is unknown to me.

525. **Chrysis jalala**, *Nurse, Entomologist*, xxxv (1902), p. 306, ♀ ♂.

"♀. Slenderly built; head, except front, thorax and abdomen closely but not very finely punctured, and very sparsely covered with short greyish pubescence; clypeus emarginate anteriorly, front concave from beneath a transverse ridge which is situated just below the vertex, covered with a somewhat sparse white pubescence, and finely transversely striate in the centre; head, thorax and first two abdominal segments of about equal width; head when viewed from above equal in size to pronotum, scutellum and postscutellum somewhat more coarsely punctured than the rest of the segments; abdomen as long as the head and thorax united, the 2nd segment with a median longitudinal carina, 3rd segment rounded at apex, with a conspicuous subapical row of foveæ. Dark blue, the clypeus bright green; the pronotum, mesonotum, scutellum and postscutellum, and a spot on the 3rd abdominal segment just above the subapical row of foveæ, green; the first abdominal segment, except the extreme base and a line on the centre above not reaching the apex, and the apical two-thirds of the 2nd abdominal segment bright coppery golden; second and following joints of flagellum of antennæ dark red; tarsi dark

testaceous, almost black; remainder of legs metallic green; wings hyaline, tegulæ dark blue, radial cell closed.

"♂. Similar, the patch of blue on the 2nd abdominal segment not transverse but somewhat wedge-shaped; no green spot on 3rd abdominal segment; antennæ light red below, except the first two joints which are metallic green.

"*Length*, ♀ ♂ 6·5–9 mm.

"*Hab.* Kashmir, 5000–6000 ft.; three specimens." (*Nurse.*)

526. **Chrysis furiosa**, *Cameron, Mem. Manch. L. Ph. Soc.* xli (1897), no. 13, p. 3, pl. 16, fig. 9.

♀. Metallic green, the space round the ocelli broadly, the front of the prothorax, the mesonotum more or less, the middle of the scutellum and of the postscutellum, the discs above of the 1st and 2nd and the basal half of the 3rd abdominal segment blue, antennæ black, the scape and the basal two joints of the flagellum above green, legs green, tarsi reddish brown; head, thorax and basal abdominal segment densely punctured, granulate, on the lateral areas of the mesonotum the punctures are larger than on the rest of the thorax and wider apart, the intervals minutely punctured, the front of the mesonotum and the apical two abdominal segments very finely punctured; facial cavity transversely rugulose. Head thick, transverse, very much broader than long; facial cavity broad and deep, sharply margined above by a transverse carina, giving off from either end carinæ closely bordering the orbits of the eyes above, as far as a point level with the anterior ocellus, then crossing the front, meeting and forming a loop round the ocellus; antennæ proportionately rather thick, the 2nd joint of the flagellum much longer than either the 1st or 3rd joint; front and vertex convex and very broad; occiput transverse. Thorax: the pronotum transversely rectangular, from above the sides appear tuberculate immediately behind the anterior lateral angles, anteriorly the pronotum is impressed in the middle above; propleuræ excavate, mesonotum and scutellum convex; mesopleuræ rugose, longitudinally grooved; postscutellum rounded, posterior lateral angles of the median segment broadly produced, acute at apex; wings hyaline, nervures light brown, tegulæ purple; legs robust. Abdomen proportionate, broad and massive, the base transverse, the sides of the 1st and 2nd segments parallel, sides of the 3rd segment strongly convergent posteriorly, terminating in an acute small tooth on each side, between which the apical margin is slightly arched and entire; the whole abdomen slightly medially longitudinally carinate, the anteapical series on the 3rd segment subobsolete.

♂ unknown.

Length, ♀ 6; *exp.* 11·5 mm.

Hab. Procured at Barrackpore, Bengal (*Rothney*).

527. **Chrysis elizabethæ**, sp. nov. (Pl. I, fig. 9.)

♀. Head, thorax, the base and apical margin of the 1st, the apical margin of the 2nd and the 3rd abdominal segment on the sides metallic green; the region of the ocelli, two spots on the pronotum, the medial area of the mesonotum, the middle of the disc of the 1st, and the greater portion of the base broadly of the 2nd and 3rd abdominal segments brilliant metallic blue; antennæ dusky black. the scape above metallic blue, the basal two joints of the flagellum above green, legs green on the outside, on the inner side together with the tarsi dusky brownish black; head, thorax and abdomen densely punctured, the punctures on the abdomen except at base somewhat finer and shallower than on the head and thorax, on the back of the thorax and median segment they are cribrate; pilosity whitish, long, abundant and slightly oblique on the head beneath, on the legs and on apex of the abdomen, entirely absent on the 1st and 2nd abdominal segments above. Head subglobose, eyes large; clypeus vertical very narrow anteriorly, at the bases of the mandibles with a coppery sheen; antennal hollow broad, within finely punctured; front with a transverse carina bent downwards at each end, giving off from the middle a broad loop, medially on which above is placed the anterior ocellus; occipital margin transverse, slightly broader than the pronotum; antennæ rather short and thick, the 2nd joint of the flagellum the longest. Thorax: the pronotum short, very convex, transversely rectangular, the sides widely but slightly emarginate, the posterior lateral angles a little produced; propleuræ excavate, the hollow finely rugulose within; mesonotum convex, medial area rectangular, somewhat narrow, about twice as long as broad, mesopleuræ coarsely punctured, angular beneath, with a well-marked oblique carina from beneath the base of the wings circling round the produced angular apex beneath; scutellum from above semicircular; postscutellum crescentic, slightly gibbous, completely hiding the median segment except its produced acute posterior lateral angles; wings hyaline with a brownish tint, nervures and tegulæ dark brown; legs slender. Abdomen somewhat long and comparatively massive, medially carinate from near the base to apex, the base with three well-marked impressions; 3rd segment nearly as long as the 2nd, with an anteapical series of 10 moderately large, round, foveate punctures, the apical margin gently rounded with two acute teeth close together in the middle; ventral segments green, smooth and shining, with the base of the 2nd and sides broadly of the 1st segment brownish black.

♂ unknown.

Length, ♀ 8; *exp.* 16 mm.

Hab. I procured one specimen of this distinct species at Tavoy in Southern Tenasserim. Superficially it resembles *C. angustata*, Mocs., but the bidentate apical margin of the abdomen distinguishes it at once.

528. **Chrysis nugatrix**, sp. nov.

♀. Dark bluish green, the discs of the 2nd and 3rd abdominal segments broadly violet-blue; in certain lights the whole of these two segments appear of that colour; the antennæ black, the scape and basal two joints of the flagellum green; legs and the basal joint of the tarsi of the posterior legs green; head and thorax densely and very coarsely punctured, rugose, 1st abdominal segment as coarsely but more sparsely punctured, not rugose, the remainder of the abdomen more finely punctured, the apical margin of the 3rd segment smooth, unpunctured, shining, slightly chitinous and translucent at base; facial cavity, around the base of the antennæ and on the clypeus entirely smooth and shining, above closely and somewhat finely punctured, pubescent, the hairs long, slightly hiding the sculpture; pilosity tolerably abundant, brownish. Head thick and broad above, as broad as the pronotum, from in front triangular, the cheeks strongly convergent anteriorly; clypeus raised in the middle, the anterior margin medially deeply emarginate; the facial cavity deep, margined above by a transverse carina, from which are emitted two curved carinæ meeting above, behind the anterior ocellus; antennæ stout, pubescent, the 2nd joint of the flagellum a little longer than the 3rd; front and vertex broad, convex; occiput sharply transverse. Thorax: the pronotum subcylindrical, declivous anteriorly, rounded and convex posteriorly, the sides slightly convergent towards the front; propleuræ with two deep hollows, smooth within; mesonotum, scutellum and postscutellum convex, the mesonotum long and ample, the scutellum rather short, transversely rectangular; mesopleuræ broad, rather short, very coarsely deeply punctured, rugose, with a medial broad line of large foveæ from under the base of the wing almost to the apex, this latter broad and obtuse; postscutellum very rough and coarsely sculptured, triangular and prominent, the apex obtuse, posteriorly entirely overhanging the median segment, of which the posterior lateral angles are very broadly produced and very acute at apex: wings fusco-hyaline, nervures brown, tegulæ purple; legs short though slender. Abdomen broad, massive, truncate or transverse at base, with a somewhat deep impression on each side and a shallower medial one; 2nd segment medially longitudinally carinate along its apical half, the basal area of 3rd segment convex, not carinate; anteapical series of foveæ large, the foveæ opening downwards; anal area medially strongly carinate, the carina terminating in a strong acute tooth, the sides slightly convergent posteriorly, the apical margin transversely truncate, armed at the

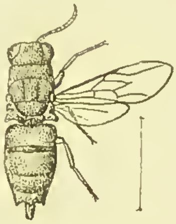

Fig. 152.
Chrysis nugatrix, ♀.

lateral angles with an acute short tooth, thus making the apical margin tridentate.

♂ unknown.

Length, ♀ 12; *exp.* 22 mm.

Hab. I procured a single specimen of this very distinct species in the verandah of a house in Delhi. It resembles in size and robustness *C. oculata*, *C. principalis* and *Stilbum*, and is by far the largest of the tridentate section of *Chrysis* known to me.

529. **Chrysis mendicalis**, *Cameron, Mem. Manch. L. Ph. Soc.* xli (1897), no. 13, p. 4.

♀. Metallic green; the vertex, collar, prothorax in front, median area on the mesonotum, and the discs broadly of the abdominal segments bluish black; antennæ dark brown, the scape in front and basal joint of flagellum above bronzy green; legs green, tarsi brown above, reddish yellow beneath; head and thorax with closely serried fine punctures, rugulose, the punctures larger on the thorax posteriorly; abdomen more finely, evenly and regularly punctured, the punctures slightly larger on the sides and somewhat shallow; facial cavity minutely transversely rugulose, pubescent; pilosity pale brown, short, soft, rather sparse. Head thick, broad, occiput rounded, not sharply transverse, vertex and front convex; facial hollow comparatively deep above, sharply margined by a transverse carina; antennæ thick, slightly flattened, the 2nd joint of the flagellum a little longer than the 3rd; clypeus transverse or very slightly emarginate anteriorly in the middle. Thorax: the pronotum short, medially longitudinally sulcate, with also a narrow transverse groove a little in front of the posterior margin; propleuræ excavate, mesonotum and scutellum slightly convex; mesopleuræ rugose, two large hollows or foveæ one above the other beneath the bases of the wings; postscutellum very convex, gibbous; the posterior lateral angles of the median segment shortly produced, broad, at apex very acute; wings hyaline, nervures light brown, tegulæ green. Abdomen long, the base above with a medial and two lateral shallow wide impressions; sides nearly parallel, those of the 3rd segment slightly convergent; apical margin of the latter with an acute tooth on each side and one in the middle, the intervals between the teeth undulate; anteapical series with 6 moderately large foveæ.

♂ very similar, slightly smaller.

Length, ♀ 5·5, ♂ 5; *exp.* ♀ ♂ 10 mm.

Hab. Recorded only from Barrackpore, Bengal (*Rothney*). Type in Mr. Rothney's collection.

530. **Chrysis lanka**, sp. nov.

♀. Metallic golden green, the middle of the scutellum and of the postscutellum and the discs of the 2nd and 3rd abdominal

segments broadly blue, the apical margins of all the abdominal segments with a brilliant effulgence in certain lights; sides of the 1st and 2nd segments with a cupreous-red spot towards the apical margins; antennæ dark brown, the scape green, the basal joint of the flagellum with a faint golden-green lustre in certain lights; legs green, the tarsi yellowish brown; head, thorax and basal abdominal segment moderately coarsely punctured, granulate, apical two abdominal segments more finely and irregularly punctured, rugulose; facial cavity finely punctured and bearing a narrow medial vertical short groove; a very sparse whitish pubescence on the sides, not obscuring the sculpture within; pilosity brownish, moderately abundant, short. Head subglobose, thick, more than twice as long as the pronotum; eyes prominent; facial cavity deep,

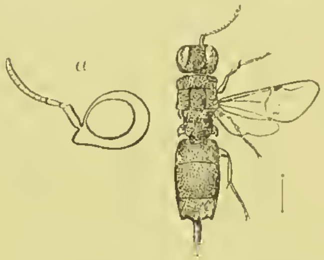

Fig. 153.—*Chrysis lanka*, ♀. *a*. Head in profile.

margined above by an arched carina; clypeus raised in the middle, front and vertex convex; antennæ long, cylindrical, the 1st and 2nd joints of the flagellum subequal and long. Thorax elongate, narrow, the sides nearly parallel; pronotum short, transversely rectangular; propleuræ excavate; mesonotum, scutellum and post-scutellum rather flat, the mesonotum short, nearly square, the scutellum transversely rectangular; mesopleuræ oblique elongate, punctured, the punctures rugulose within, apex not acute; post-scutellum rather long, narrow, rounded posteriorly, the produced posterior lateral angles of the median segment somewhat broad, acute at apex; wings lightly fusco-hyaline, nervures and tegulæ dark brown; legs rather long and slender. Abdomen narrow elongate, subcylindrical, the sides nearly parallel, a little convergent posteriorly, the base transverse; a short, shallow, longitudinal impression above, the apical margin transverse, armed at the lateral angles and in the middle with a short tooth, no traces of a medial longitudinal carina on the 2nd and 3rd segments; the anteapical series distinct, the foveæ small.

♂ unknown.

Length, ♀ 3·5; *exp*. 6·5 mm.

Hab. Recorded so far only from Ceylon, Peradeniya (*Green*).

531. **Chrysis triacantha**, *Mocsáry* (Trichrysis), *Mon. Chrys.* 1889, p. 325; *du Buyss. Jour. Bomb. N. H. Soc.* x (1896), p. 471.

♀. Dark metallic green or bluish green, the space round the ocelli, the median lobe of the mesonotum, the middle of the scutellum, and the disc on either side of a median line on the 2nd and 3rd abdominal segments purplish, the purple on the abdomen very much lighter in colour and forming only a transverse spot on the 3rd segment, round the ocelli and on the mesonotum anteriorly the purple grades into black; the antennæ black, scape in front and 1st joint of flagellum above green; legs green, the inner side of the femora dark, the inner side of the tibiæ and the whole of the tarsi lighter brown; head and thorax closely, moderately coarsely punctured, granulate, abdomen more finely punctured; a space at base of the scutellum almost smooth, with minute punctures; pilosity brownish, somewhat sparse. Head broader than long, the

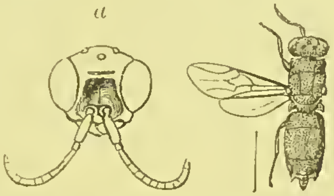

Fig. 154.—*Chrysis triacantha*, ♀. *a.* Head from front.

eyes prominent; facial cavity rugulose, covered somewhat densely with white hairs; clypeus broad, emarginate in the middle anteriorly, frontal transverse carina very short; anterior ocellus not enclosed within a carinate space, occiput transverse. Thorax: the pronotum short, transversely rectangular, medially impressed in front, the side emarginate at base, the anterior lateral angles somewhat truncate; propleuræ excavate; mesonotum, scutellum and post-scutellum very convex, median area on mesonotum broadened anteriorly; mesopleuræ longitudinally impressed, the apex beneath not dentate; median segment suppressed beneath the postscutellum, posterior lateral angles shortly produced, acute; wings hyaline, very lightly fuscous, nervures brown, tegulæ greenish blue. Abdomen a little depressed, deeply sulcate in the middle at base above, the sulca short and smooth within, a shallower impression on each side of the medial groove; 2nd and 3rd segments lightly medially carinate, the anteapical series of foveæ on the latter few, 6–8, large and open, apical margin armed with 3 teeth. ♂ unknown.

Length, ♀ 6·8–7; *exp.* 13 mm.

Hab. Recorded so far from Calcutta (*du Buysson*) and Ceylon (*Green*); extending to the Malayan subregion.

532. **Chrysis singalensis**, *Mocsáry* (Trichrysis), *Mon. Chrys.* 1889, p. 324. (Pl. I, fig. 4.)

♀. Metallic green, with golden effulgence on the sides of the

thorax and abdomen and on the legs; the space round the ocelli, two or three spots on the pronotum, the medial area more or less of the mesonotum, the scutellum, and 2nd and 3rd abdominal segments medially purplish blue, mixed with black on the scutellum and medial area of mesonotum; antennæ black, the scape in front green, the legs green, the tarsi brown; pilosity brownish, short, fairly abundant; the facial hollow with rather long whitish recumbent hairs on the sides; head, thorax and abdomen densely, somewhat evenly punctured, the punctures within rugulose. Head from the front broad, much broader than long, the sides convergent anteriorly; clypeus broad, subporrect; antennæ rather long, slender, cylindrical; the facial hollow with a transverse carina a little above its upper margin, vertex convex, anterior ocellus free, not set in a hollow nor with lateral carinæ. Thorax: the pronotum transversely rectangular, the sides sinuate, the anterior lateral angles distinctly truncate; mesonotum slightly convex, the medial area rectangular; mesopleuræ strongly margined, grooved posteriorly, the apex beneath excavate; scutellum and postscutellum convex, the median segment vertical, almost hidden under the postscutellum, its posterior lateral angles produced, acute; wings hyaline, nervures and tegulæ brown; legs short. Abdomen medially distinctly carinate; the 1st segment with a medial broad short groove at base, and a slight hollow on the base at each side; the apical margin of the 3rd segment with the middle and the posterior lateral angles dentate, and an anteapical lateral series of 6 foveæ, the lateral ones sometimes obsolete.

Length, ♀ 6–6·5; *exp.* 13 mm.

Hab. Ceylon (*apud Mocsáry*); Kandy, Peradeniya (*Green*). I have not seen a ♂ of this species.

533. **Chrysis scioensis**, *Grib. Ann. Mus. Civ. Gen.* xiv (1879), p. 344; *id. l. c.* xvi (1881), p. 251; *Mocs.* (Trichrysis), *Mon. Chrys.* 1889, p. 321; *du Buyss. Jour. Bomb. N. H. Soc.* x (1896), p. 471.

♀. Dark metallic green, the space round the ocelli, the median area of the mesonotum, and the bases and discs slightly of the apical two abdominal segments dark metallic blue, getting black in the middle of the space round the ocelli; antennæ brown, scape in front and first joint of flagellum above green. In some specimens this blue is more or less absent. Head, thorax and abdomen moderately coarsely and evenly punctured, the punctures smaller and more distantly spaced on the 2nd and 3rd abdominal segments, and minutely punctured within on the thorax; pilosity brownish, moderately abundant, exceedingly short on the basal two abdominal segments. Head much broader than long, the eyes very prominent; clypeus broad, widely emarginate in the middle anteriorly: facial hollow moderately deep, rugose within, covered with long white hairs, above bi-carinate, the lower margin or carina indistinct, the upper in two arches in some specimens, simply widely

arched, transverse, no emitted carinæ towards the anterior ocellus; front and vertex rounded, convex, occiput transverse; antennæ rather long, the 2nd joint of the flagellum longer, about twice as long as the 1st joint. Thorax: the pronotum short, transversely rectangular, medially impressed above, the sides emarginate at base, then with a rounded angle towards the front; propleuræ excavate; mesonotum, scutellum, and postscutellum convex, the median area on the mesonotum rectangular, the suture between scutellum and postscutellum not transverse, gently arched posteriorly; mesopleuræ rugose, not dentate beneath, with a broad oblique groove; postscutellum from above semicircular, somewhat compressed; median segment hidden and suppressed beneath, the posterior lateral angles shortly produced, acute; wings hyaline, with a slight fuscous tint towards the costal margin, nervures brown, tegulæ bluish green; legs slender, bluish green, tarsi dark brown. Abdomen rather short, not longer than the head and thorax united, the basal segment with a deep impression in the middle above and a shallower impression on each side of it; the 2nd segment without any medial longitudinal carina, the anteapical series on the third segment with the foveæ small and few, from 8–10; apical margin of segment strongly tridentate.

♂. Very similar, slightly more slender, the apical abdominal teeth not so acute.

Length, ♀ ♂ 7; *exp.* 13 mm.

Hab. N. India, Delhi (*Bingham*); Karáchi (*Cumming*); extending to Aden (*Yerbury*). Described originally from Equatorial Africa.

534. **Chrysis paria**, sp. nov.

♂. Metallic green, with blue effulgence in certain lights, the front of the median area of the mesonotum, the postscutellum and the disc above of the 2nd abdominal segment more decidedly blue, the last deep violet-blue; antennæ brown, the scape deep blue, the 1st joint of the flagellum above green; legs bluish green, articulations and tarsi reddish yellow; head and thorax moderately finely punctured, rugose, the punctures rather shallow; abdomen more finely and regularly punctured, not rugose; facial cavity finely punctured, with short whitish pubescence; pilosity greyish, long and fairly abundant. Head thick, transverse, from the front very much broader than long and with the eyes much broader than the pronotum; occiput and front somewhat sharply transverse, from above the head appearing longitudinally compressed; facial hollow broad, somewhat shallow, arched above and margined by a transverse carina; antennæ long, slender, the 2nd joint of the flagellum slightly longer than the 3rd. Thorax short, subcylindrical, the sides rounded, converging slightly to the front; propleuræ excavate; mesonotum and scutellum convex, the suture between them depressed; mesopleuræ convex, a large fovea underneath the base

of the wings and a short transverse groove dividing off the triangular apex beneath; postscutellum convex, slightly gibbous, the produced posterior lateral angles of the median segment proportionately large, acute at apex; wings hyaline, iridescent, nervures yellowish brown, tegulæ blue. Abdomen somewhat short and broad, the base transverse, medially broadly impressed; 2nd segment not carinate; 3rd segment very convex, the apical margin continuous with the sides, rounded, and armed in the middle with 3 acute little teeth, the apical area and margin below the anteapical series very narrow, yellowish brown and chitinous, the series not very distinct, of 8 or 10 rounded punctures. ♀ unknown.

Length, ♂ 4·5; *exp.* 8 mm.

Hab. Recorded from Baluchistan, Quetta (*Nurse*).

535. **Chrysis autocrata**, *Nurse, Entomologist*, xxxvi (1903), p. 40, ♀.

"♀. Stoutly built; frontal cavity finely, head and thorax somewhat irregularly, the latter coarsely, punctured; abdomen, especially 2nd and 3rd segments, more regularly and finely punctured; pronotum distinctly narrower at base than at apex, its shoulders slightly rounded, and having a median longitudinally impressed line at base; 2nd and 3rd abdominal segments distinctly carinated; 3rd segment without subapical foveæ, quadridentate, the inner teeth close together and blunt, the outer teeth smaller, sharper, and not projecting nearly so far back as the inner ones. Head, thorax and 1st abdominal segment metallic green with blue reflections; 2nd and 3rd segments lighter green with a golden or coppery effulgence; antennæ piceous; tarsi rufo-testaceous; wings hyaline, nervures and tegulæ brownish testaceous; head, sides of thorax and abdomen and legs with some sparse, rather long pubescence.

"*Length*, ♀ 8·5 mm.

"*Hab.* Quetta, 2 specimens." (*Nurse.*)

536. **Chrysis gujaratica**, *Nurse, Entomologist*, xxxvi (1903), p. 11, ♀. (Pl. I, fig. 3.)

♀. Head and thorax light metallic green, with brilliant golden effulgence on the head posteriorly, on the pro- and mesonotum and on the scutellum; postscutellum, and the thorax beneath and on the sides bright light metallic green without the golden sheen; posterior lateral angles of the median segment bright golden yellow: legs and abdomen golden green with brilliant coppery effulgence; antennæ and the tarsi brown, the scapes of the former very dark brown, nearly black, the latter and the flagella a light yellowish brown. Head, thorax and abdomen very densely punctured, the punctures on the head, the pronotum, lateral areas of the mesonotum, the median segment and abdomen fine and rather shallow, on the median area of the mesonotum they are larger and wider apart, and on the scutellum and postscutellum rather coarser; facial cavity very finely rugulose and covered somewhat densely

with soft white pubescence; pilosity whitish, short and fairly abundant, on the legs the hairs are long and oblique. Head thick, as long and as broad as the pronotum; clypeus wide, medially rectangularly produced, its anterior margin in the middle transverse; facial hollow moderately deep, bordered above by an irregular transverse carina on the front, the ends of which do not extend to the eyes on each side; antennæ rather slender, the 2nd joint of the flagellum twice as long as the 1st, the 3rd joint very short; front and vertex broad and lightly convex, occiput very slightly and very widely emarginate, nearly transverse. Thorax: the pronotum transversely rectangular, the sides of the prothorax concave; mesonotum, scutellum and postscutellum gently convex, the median area of the mesonotum broad, a little longer than broad, mesopleuræ finely punctured, strongly convex; the apex beneath very narrow, subacute and excavate, postscutellum short, crescentic; median segment with the produced posterior angles very narrow, curved inwards, acute at apex; wings hyaline, slightly fuscous on the disc, nervures brown, tegulæ purple; legs slender. Abdomen massive, broad, the 1st segment concave at base, shortly and slightly longitudinally impressed above in the middle of its anterior margin; 2nd and 3rd segments obsoletely medially longitudinally carinate; the anteapical series of foveæ on the latter segment obsolete; apical margin strongly arched, with four narrow, rather long acute teeth.

♂. Identical in form and in the armature of the abdomen, but entirely dark green with blue shadings on the thorax and on the 2nd and 3rd abdominal segments; the puncturing is much coarser, almost granulate.

Length, ♀ 9, ♂ 8·75; *exp.* ♀ ♂ 17 mm.

Hab. So far recorded only from Northern Gujerat, Deesa (*Nurse*); Delhi (*Bingham*).

537. **Chrysis annulata**, *du Buyss. Rev. d'Ent.* vi (1887), p. 192, ♂; *id. l. c.* xix (1900), p. 148, ♀; *Mocs.* (Tetrachrysis), *Mon. Chrys.* 1889, p. 422. (Pl. I, fig. 14.)

Chrysis fulvicornis, *Mocs.* (Tetrachrysis), *Mon. Chrys.* 1889, p. 427.
Chrysis quettaensis & C. balucha, *Nurse*, *Entomologist*, xxxvi (1903), p. 41.

♀. Metallic light golden green, the median area of the mesonotum, the hollows in the propleuræ, the coxæ, femora and tibiæ of the legs, and the apical margin of the 3rd abdominal segment dark metallic blue; the 1st, 2nd and basal area of 3rd abdominal segment effulgent, golden, coppery red; antennæ and tarsi brown, the scape in front and the basal two joints of the flagellum above green; head, thorax and abdomen somewhat coarsely and very evenly and closely punctured; the facial cavity finely rugulose; pilosity yellowish white, short, rather sparse. Head as long and as broad as the pronotum; clypeus broad, slightly emarginate in the middle anteriorly; facial cavity moderately deep, clothed with very short white pubescence, margined above and with a transverse

somewhat irregular carina above the margin on the front, anterior ocellus not enclosed within carinæ, vertex convex, occiput transverse; antennæ: the 2nd and 3rd joints of the flagellum subequal. Thorax: the pronotum transversely rectangular, the sides parallel; a shallow medial longitudinal groove anteriorly above; mesonotum and scutellum convex, the median area on former rectangular; mesopleuræ with a broad longitudinal impression from beneath the wings to the apex beneath, bordered posteriorly and round the apex by a carina, the apex not dentate; postscutellum sloping posteriorly, rounded; posterior lateral angles of the median segment produced, flat above, acute at apex; wings hyaline, nervures brown, tegulæ metallic dark blue. Abdomen a little longer than the head and thorax united, the 1st segment transverse at base, not or very slightly impressed in the middle above; 2nd segment more or less medially distinctly carinate; 3rd segment depressed transversely at base in front of the anteapical series of foveæ, these latter 6–8 in number, large and open below, apical margin with 4 almost equidistant teeth.

♂. Differs from the ♀ in being entirely green, with in certain lights a cupreous spot on each side of the apical margin of the 2nd abdominal segment; the puncturing is a little coarser, especially on the abdomen; the flagella of the antennæ and the tarsi brownish yellow, the 4th joint of the former being longer than any of the basal three joints.

Length, ♀ 6·5–7, ♂ 6–6·8; *exp.* ♀ ♂ 13 mm.

Hab. Syria, Arabia, Persia, Turkestan, extending into Baluchistan; Quetta (*Nurse*), but not recorded from any other locality within our limits. It is an extremely variable species, a specimen (♂) also from Quetta is very much more blue than green.

538. **Chrysis apiata**, *du Buyss. Rev. d'Ent.* xix (1900), p. 149, ♂.
Chrysis lucinda, *Nurse, Entomologist,* xxxvi (1903), p. 12, ♀ ♂.

♀. Head and thorax metallic green with golden effulgence; basal two segments of abdomen coppery golden, basal half of the 3rd segment deep blue, apical half and a fine median longitudinal line through the blue, green with golden effulgence; scape of the antennæ and coxæ, femora and tibiæ of the legs metallic blue; flagellum and tarsi reddish brown, the basal joint of the former greenish or bluish above; head, thorax and abdomen somewhat coarsely and closely punctured, the punctures on the head and thorax cribrate, on the discs of the segments of the abdomen a little more distant; pilosity soft, white, fairly abundant but short, oblique on the abdomen. Head from above about as long and as broad as the thorax; clypeus short, broad, indistinctly vertically carinate, the apex in the middle emarginate; facial hollow not margined or carinate above, medially with a short, shallow longitudinal groove and with recumbent silvery pubescence within, no frontal carinæ; occiput slightly and very widely emarginate.

Thorax: the pronotum convex, nearly transversely rectangular; the sides sinuate and slightly longer than the notum in the middle, where there is a medial, broad, shallow longitudinal groove not quite reaching the posterior margin; propleuræ excavate; mesonotum, scutellum and postscutellum slightly convex; the median area on the metanotum rectangular, a little widened anteriorly and posteriorly; mesopleuræ a little more coarsely rugose than the thorax above, the apex beneath margined by a carina which is continued up on the posterior side to beneath the base of the wings; postscutellum slightly gibbous, the median segment depressed beneath it, the posterior lateral angles of the latter produced, acute: wings hyaline, nervures brown, tegulæ greenish blue; legs comparatively short. Abdomen proportionately massive, the 1st segment at base widely emarginate, slightly impressed in the middle above, with the anterior angles prominent; 2nd segment indistinctly medially longitudinally carinate; 3rd segment elliptical; the anteapical series of foveæ rather small; the apical margin with 4 rather long triangular acute teeth, the outer ones the shorter.

♂. Similar; the flagellum of the antennæ a lighter brown, the 1st and 2nd segments metallic green with a golden effulgence, but not with the beautiful coppery golden sheen of the ♀ in the specimen I have seen. The type-specimen, however, according to du Buysson has the abdomen fiery golden ("feu-doré").

Length, ♀ 8, ♂ 7; *exp.* ♀ 16, ♂ 15 mm.

Hab. Baluchistan, Quetta (*Nurse*); extending to Persia (*du Buysson*).

539. **Chrysis greeni**, sp. nov. (Pl. I, fig. 7.)

♀. Head, pronotum, scutellum, postscutellum, median segment and sides of the thorax metallic green, the space round the ocelli and the middle of the occiput black, the former shading into dark blue on the margins; the mesonotum, the discs of the basal two abdominal segments, and the disc and apical margin of the 3rd segment dark metallic purple, this purple on all the segments bordered by green and succeeded on the apical margins of the 1st and 2nd segments by a broad transverse bar of fiery metallic red; scape of the antennæ and basal joint of the flagellum above green, remainder of the flagellum dusky black; the vertical front surface of the prothorax and the coxæ, femora and tibiæ of the legs purplish blue, tarsi dark brown; head, thorax and abdomen somewhat finely and very closely punctured, granulate, the punctures on the abdomen shallower than on the head and thorax; pilosity brownish, short, fairly abundant, oblique on the abdomen and legs. Head about as broad as the pronotum and a little longer; clypeus broad, slightly vertically carinate and emarginate in the middle; facial hollow comparatively deep, transversely finely rugulose, not margined above, but above it on the front

is a short transverse carina, not extending on each side to the orbits of the eyes, with no carinæ emitted towards the anterior ocellus; front and vertex convex; occiput from above widely emarginate. Thorax: the pronotum short, transversely rectangular, longer at the sides than in the middle, the latter slightly emarginate with the anterior lateral angles truncate; propleuræ excavate; mesonotum, scutellum and postscutellum lightly convex; mesopleuræ rugose, slightly excavate at apex beneath; median segment depressed beneath the postscutellum, the posterior lateral angles prominent and acute at apex; wings hyaline, nervures and tegulæ brown. Abdomen a little depressed, the 2nd segment medially strongly carinate, the 3rd segment with the anteapical series of foveæ small, the apical margin ending in 4 very broad and short but acute teeth.

♂ unknown.

Length, ♀ 5·5; *exp.* 10·5 mm.

Hab. Recorded so far only from Tangala in Ceylon (*Green*). Mr. Green attached the following note to the specimen he kindly sent me: "Found in rose twig in tunnel formed by *Crabro* sp.?"

540. **Chrysis obliterata**, *Mocsáry* (Tetrachrysis), *Mon. Chrys.* 1889, p. 377; *du Buyss. Jour. Bomb. N. H. Soc.* x (1896), pp. 472 & 473, pl. iii, fig. 5, ♀♂.
Chrysis orientalis, *Dahlb.* (*nec Guér.*) *Hym. Eur.* 1854, p. 225, ♀.

♀. Metallic green, the median area of the mesonotum, the bases and the discs of the 2nd and 3rd abdominal segments violet-blue; antennæ brown, the scape in front and the basal two joints of the flagellum above bluish green; legs green, tarsi reddish brown; head, thorax and abdomen closely but not densely punctured; the punctures irregular, the larger punctures mixed with many minute points; the punctures on the thorax posteriorly coarser and on the abdomen somewhat finer than on the rest of the body; facial cavity finely rugulose, with some short whitish pubescence which does not, however, conceal the sculpture; pilosity whitish, very short and somewhat sparse. Head thick, slightly broader than the pronotum; clypeus broad, raised in the middle; facial cavity moderately deep, margined above by a slight transverse carina; antennæ moderately long, the 2nd joint of the flagellum a very little longer than the 3rd; front and vertex convex, occiput transverse. Thorax: the pronotum subcylindrical, the sides convergent towards the front, the middle anteriorly slightly impressed; propleuræ slightly excavate; mesonotum and scutellum slightly convex; mesopleuræ convex, longitudinally grooved, the apex excavate and divided off by a short transverse groove; postscutellum from above semi-

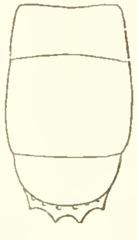

Fig. 155.
Chrysis obliterata, ♀.

circular; posterior lateral angles of the median segment produced, small and triangular; wings hyaline, pubescent, nervures brown, tegulæ bluish green. Abdomen subcylindrical, sides slightly convergent anteriorly, the base transverse, lightly impressed in the middle above; 3rd abdominal segment convex, the anteapical series of foveæ nearly obsolete, the foveæ represented by shallow subeffaced punctures, apical margin armed with 4 subequal triangular teeth.

"♂. Differs from the ♀ by the facial cavity being shorter; the antennæ reddish-maroon, the 3rd joint (2nd of the flagellum) being subequal with the 4th; the sculpture coarser, the tarsi reddish, the 3rd abdominal segment shorter. In some specimens the scutellum, pronotum, breast, legs and 1st abdominal segment have a coppery tint." (*du Buysson.*)

Length, ♀ 6–8·5; *exp.* 11·5–13 mm. Dimensions of the ♂ not given.

Hab. N. India, Delhi (*Bingham*); N. Gujerat, Deesa (*Nurse*); Bombay, Poona (*Wroughton*); Central Provinces (*Betham*).

A variable insect, in some specimens the ♀ has the scutellum and basal abdominal segment golden green, coppery in certain lights, similar to the ♂ as described above.

541. Chrysis disparilis, *Cameron, Mem. Manch. L. Ph. Soc.* xli (1897), no. 13, p. 5.

♀. The head except the vertex and occiput, the pronotum, the produced posterior lateral angles of the median segment, the 1st abdominal segment except the disc, a transverse bar broadening at the sides on the posterior margin of the 2nd segment and the middle of the 3rd segment golden green, brightening to coppery gold on the sides of the 2nd abdominal segment; the vertex, the mesonotum and the postscutellum deep metallic blue, the disc of the 1st, the whole basal portion of the 2nd segment, and the basal half and apical area of the 3rd segment also dark metallic blue, deepening to black at the base of the 2nd segment; antennæ blackish brown, the scape and the 1st joint of the flagellum above bluish green; sides of the thorax and legs green, tarsi reddish brown; head and thorax densely punctured, the punctures serried, rugose, on the scutellum and postscutellum as usual somewhat larger; abdomen finely and regularly punctured, the punctures close but not dense or serried; facial cavity rugulose, finely punctured, covered with snow-white pubescence; pilosity light brown, very short, fairly abundant on the head, thorax and apical segment of the abdomen, entirely wanting on the basal two segments above. Head longer and broader than the pronotum; the sides behind the upper part of the eyes broad and well-developed; occiput emarginate; vertex and front broad, convex, not distinctly margined, but traces of a transverse carina above the margin; antennæ short, the 2nd joint of the flagellum

long, the 1st and 3rd subequal. Thorax: the pronotum short, transversely rectangular, a little impressed in the middle above, the sides sinuate; propleuræ excavate; mesonotum and scutellum nearly flat, very slightly convex; mesopleuræ rugose; postscutellum convex, rounded; the produced posterior lateral angles of the median segment small, narrow, acute at apex: wings hyaline, nervures brown, tegulæ purple. Abdomen comparatively short, transverse at base, medially longitudinally carinate, the sides slightly convergent posteriorly; the apical margin somewhat sharply transverse, bearing 4 short acute, nearly equidistant teeth; the foveæ in the anteapical series few in number, about 6, large, deep and open.

♂. Almost identical, slightly broader, the antennæ longer; the foveæ in the anteapical series very much smaller, nearly obliterated.

Length, ♀ 5·5–6·5, ♂ 5·5–6; *exp.* ♀ ♂ 12 mm.

Hab. Bengal, Barrackpore (*Rothney*); Deesa (*Nurse*); Ceylon (*Green*). Type in Mr. Rothney's collection.

542. **Chrysis thalia**, *Nurse, Entomologist*, xxxvi (1903), p. 41, ♀ ♂.

♀. Metallic green, a spot on the sides of the head behind the eyes, the middle indistinctly of the scutellum, and very narrowly the apical margins of the 1st and 2nd abdominal segments golden; the median area on the mesonotum, the bases broadly of the 1st and 2nd, the base broadly, and sides and apical margin of the 3rd abdominal segment dark metallic blue; antennæ brown, the scape in front green; the 1st joint of the flagellum above bronze; legs green, tarsi yellowish brown; head, thorax and abdomen very evenly punctured, the punctures close but not dense and not larger on the thorax than on the abdomen; facial cavity very minutely transversely rugulose, almost smooth, in some specimens more coarsely sculptured than in others, the pubescence within thin, almost wanting; pilosity brownish, fairly abundant. Head as broad as the pronotum, thick; the clypeus broad, arched anteriorly in the middle; the facial cavity moderately deep, with an irregular transverse carina above it on the front; anterior ocellus placed in a slight depression, not nearly so marked as in *C. fuscipennis*; antennæ slender, the 2nd joint of the flagellum a little longer than the 3rd; front and vertex convex, occiput slightly but distinctly widely emarginate. Thorax narrow, elongate; the pronotum transversely rectangular, the anterior margin sharply transverse, a slight medial depression anteriorly; propleuræ with a longitudinal oval excavation bounded beneath by a short high carina; mesonotum, scutellum and postscutellum gently convex; the mesopleuræ punctured, with a longitudinal groove, and the apex beneath excavate, groove and apex margined; postscutellum large and somewhat gibbous, rounded posteriorly, entirely overlying the median segment, except the produced posterior lateral angles which are acute at apex. Wings hyaline, nervures and tegulæ brown; legs slender. Abdomen narrow,

elongate; the sides of the 3rd segment slightly convergent posteriorly; the 1st segment transverse at base with three slight broad impressions above, the 2nd segment strongly medially longitudinally carinate; the 3rd segment transverse at the apical margin, armed with 4 triangular equal teeth; the anteapical series of foveæ large and distinct, the apical margin below them in some specimens slightly translucent.

♂. Identical with the ♀.

Length, ♀ ♂ 5·5–7; *exp.* 10·5–13 mm.

Hab. Quetta (*Nurse*); Delhi (*Bingham*); Ceylon, Peradeniya (*Green*). The Ceylon specimen is smaller and with more blue about it. Extending to Persia (*Cumming*).

543. **Chrysis nursei**, sp. nov.

♂. Light metallic green, the abdomen with a coppery effulgence; antennæ reddish brown, the scape in front green, no green or blue on the upper side of the basal joints of the flagellum; legs green, tarsi brownish yellow; head and pronotum very finely and densely punctured, the punctures irregular and serried one against the other, giving a somewhat finely granulate appearance; lateral areas of the mesonotum reticulate-punctate, median area of the same, the scutellum and postscutellum with much larger and rather distant punctures, the intervals between them smooth and polished; abdomen punctate, the punctures moderately large

Fig. 156.—*Chrysis nursei*, ♂. *a.* Postscutellum and median segment; *b.* Apical margin of abdomen.

and shallow; facial cavity somewhat finely punctured, very thickly pubescent, the pubescence white, entirely concealing the sculpture; pilosity light brownish, very short and abundant. Head thick, about as broad and as long as the pronotum; facial cavity indistinctly margined above, 3rd joint of the flagellum of the antennæ the longest; clypeus slightly raised in the middle, not emarginate anteriorly; the mandibles bidentate, front above facial cavity slightly concave; vertex broad and convex; occiput transverse. Thorax: the pronotum massive, transversely rectangular; the sides slightly convergent, the anterior lateral angles somewhat rounded, the middle anteriorly broadly but very slightly impressed; propleuræ excavate; mesonotum and scutellum gently convex; the mesopleuræ convex, longitudinally grooved from beneath the base of the wings to the apex; postscutellum rounded posteriorly, completely

overlying the median segment, the produced posterior lateral angles of the latter very narrow, the apex acute, pointing backwards; wings hyaline, nervures light yellowish brown, tegulæ greenish blue; legs somewhat long and slender. Abdomen short, broad, the base transverse, the upper margin at base declivous anteriorly, the sides of the basal two segments parallel, the sides and apical margin of the 3rd forming a semicircular arch set with 4 acute, rather short and narrow spinoid teeth; the 2nd and 3rd segments slightly medially longitudinally carinate, the anteapical series on the latter subobsolete; the foveæ small, few in number, round, some indistinct.

♀ unknown.

Length, ♂ 6·5; *exp.* 12 mm.

Hab. Recorded so far only from Deesa in Northern Gujerat (*Nurse*).

544. **Chrysis gracilenta**, *Mocsáry* (Tetrachrysis), *Mon. Chrys.* 1889, p. 375.

♀. Metallic green, the space round the ocelli, the occiput and anterior margin of the pronotum medially, and the medial lobe of the mesonotum very dark blue mixed with black; the tegulæ, the basal medial portion of the 1st and greater part of the 2nd segment of the abdomen dark metallic blue; the thorax posteriorly, the sides of the 1st, the sides and apical margin of the 2nd and apical margin of the 3rd abdominal segment bluish green; the scape of the antenna in front, the basal two joints of the flagellum above, and the legs (except the tarsi) bluish, the rest of the flagellum dusky black, the tarsi brownish; head and thorax closely and coarsely, the abdomen more finely punctured; pilosity short, dark and fairly abundant, no white pubescence in the facial cavity or on the legs. Head much broader than long, the clypeus broad but very short; the facial hollow deep, a curved transverse carina between its upper margin and the anterior ocellus, the latter with no carinæ on either side; antennæ somewhat short, the 3rd joint of the flagellum the longest; the vertex broad. Thorax: the pro- and mesonotum convex, the former transversely rectangular, the median lobe of the latter rectangular; mesopleuræ rugose, margined, angular below; scutellum, postscutellum and median segment rounded, convex, the posterior lateral angles of the last moderately produced and prominent; legs comparatively slender; wings hyaline, nervures brownish. Abdomen with a short, broad, longitudinal medial impression at base; the 2nd abdominal segment medially carinate; the apical margin of the 3rd segment quadridentate.

Length, ♀ 6; *exp.* 12 mm.

Hab. Recorded within our limits from Upper Burma, Mandalay (*Fea*); extends to China. I procured one specimen of what is possibly the ♂ of this species in Tenasserim. It does not differ in size or sculpture, but is much greener with slightly darker wings.

545. **Chrysis speculata**, *du Buysson, Jour. Bomb. N. H. Soc.* x (1896), pp. 471 & 473, pl. 3, fig. 4, ♀.

♀. "Body of moderate size and somewhat robustly built, slightly depressed, recalling the form of *C. grohmanni*, Dahlb.; greenish blue, with the lateral areas of the mesonotum, the sides of the 1st abdominal segment, two large lateral spots on the 2nd and two more on the 3rd fiery golden; the vertex, the median area of the mesonotum, and the bases of the 2nd and 3rd abdominal segments deep blue; pubescence long, whitish. Facial cavity short, broad, covered with thick white hairs, above margined by a double transverse carina; cheeks very short, strongly convergent anteriorly; mandibles simple; antennæ blackish, the first two joints and the base of the 3rd green, the 3rd joint nearly as long as the two following united; pronotum very short, convex, anteriorly declivous; punctation anteriorly moderate, irregular, slightly rugulose, moderately serried; postscutellum convex, posterior lateral angles of the metathorax small, obtuse at apex; tegulæ maroon-coloured, chitinous; wings hyaline; legs green, slightly golden at the junction of the femora and tibiæ, set with thick white hairs, tarsi brown. Abdomen oval, moderately punctured, the punctures serried and mixed with finer punctures; the posterior lateral angles of the 2nd segment rounded; 3rd segment with large, widely spaced, reticulate punctures, the sides long and straight, the anteapical series slightly hollow at the apex, more so than on the sides; 10 foveæ, open, of moderate size, irregular, subconfluent; apical margin quadridentate, the teeth subchitinous, triangular, subacute, placed along a very curved line, the medial two closer to one another than either is to the next tooth exteriorly; the outer teeth much shorter, separated from the medial teeth and from the sides of the segment by a wide rounded emargination, the median emargination much smaller and triangular; the ends of the margin prominent and forming with the sides a slight angle. Ventral side of abdomen greenish blue, with black spots.

"*Length*, ♀ 6 mm.

"*Hab.* Bombay Presidency, Poona (*Wroughton*)." (*du Buysson.*)

546. **Chrysis cupreiventris**, *Bingh. Jour. Bomb. N. H. Soc.* xii (1898), p. 117, ♀.

♀. Head and thorax metallic blue or bluish green; abdomen ruby-red to deep cupreous red with a brilliant metallic effulgence, shaded on the discs of the segments with violet-blue or purple; front of the face in some specimens golden green; the scapes of the antennæ and legs bluish green, flagella of the antennæ and tarsi dark brown or black; head and thorax closely and somewhat coarsely punctured, the punctures not very deep, especially on the head and on the thorax anteriorly, on the scutellum and postscutellum they are deeper, coarser and somewhat cribrate; abdomen very densely and much more finely

punctured, the punctures on the basal two segments running into reticulations and irregular fine striæ in certain lights; base of the 3rd segment smooth, remainder very minutely and densely punctured; pilosity brownish, fairly abundant, long and soft on the head and thorax, much shorter and a little more sparse on the abdomen. Head slightly longer and somewhat broader than the pronotum; the clypeus broad, margined and transverse anteriorly in the middle; facial hollow shallow, closely and somewhat finely punctured, granulose, its upper margin bordered by a bi-sinuate transverse carina, with a medial much shorter perpendicular carina emitted downwards from it into the facial hollow. Thorax: pronotum transversely rectangular, a little longer at the sides than in the middle, with a medial longitudinal shallow impression on the anterior margin above; propleuræ excavate; mesonotum, scutellum and postscutellum convex, the latter two with a gentle slope posteriorly to the median segment; the median area on the mesonotum rectangular; mesopleuræ rugose, rounded beneath, the apical portion slightly excavate; postscutellum somewhat gibbous posteriorly, from above semicircular; median segment with the lateral angles broadly produced and acute at apex; wings slightly fusco-hyaline, nervures dark brown, tegulæ purplish blue. Abdomen long, longer than the head and thorax united; the basal segment sloping anteriorly, the 2nd and 3rd segments medially carinate, the apex of the carina on the 3rd segment subtuberculate; the preapical series of foveæ on the same large and open below, the apical margin with four broad triangular teeth acute at apex and equidistant from one another.

♂ unknown.

Length, ♀ 9–10; *exp.* 18 mm.

Hab. Recorded from the Himalayas, Simla (*Nurse*); Sikhim (*Bingham*).

The representative in India of our English *Chrysis ignita*, to which it is very closely allied. It differs, however, slightly in colour, the abdomen above being shaded with blue; and markedly in sculpture, the abdomen being much more finely punctured.

547. **Chrysis sandaracata**, sp. nov.

♀. Head and thorax green; the space round the ocelli, the occiput, the front and median area of the mesonotum, the middle of the scutellum, postscutellum and median segment violet-blue; the face in front, the scape and basal joint of the antennæ above, the coxæ, femora and tibiæ of the legs and the abdomen bright metallic golden green; the apical margins and sides broadly of the basal two abdominal segments metallic coppery red bordered inwardly with bright golden, the medial longitudinal carinæ on the 2nd and the sides of the basal area of the 3rd segment golden. In certain lights the facial cavity and the sides of the scutellum have a golden sheen. Head and thorax densely reticulate-punctate, the punctures largest on the scutellum and

postscutellum and minute along the anterior margin of the mesonotum; abdomen thickly punctured, the punctures shallow, moderately large and running into reticulations on the basal two segments, minute and very dense on the 3rd segment; facial hollow densely minutely reticulate-punctate, covered with sparse yellow erect pilosity; the pilosity on the rest of the head and thorax yellow, long and abundant, on the abdomen very short, somewhat sparse. Head broader than the front of the pronotum, vertex and front convex and sloping anteriorly; facial cavity comparatively deep, rather sharply margined above by a transverse carina, with, however, no subsidiary carinæ emitted towards the ocelli; antennæ long and slender, the 2nd joint of the flagellum remarkably long, more than twice the length of the 3rd. Thorax: the pronotum subcylindrical, impressed in the middle anteriorly, the sides strongly convergent towards the front; propleuræ deeply excavate; mesonotum and scutellum gently convex; mesopleuræ very rugose and impressed with 3 or 4 deep foveæ; postscutellum rounded posteriorly, bearing a slight impression in the middle at base; the produced lateral angles of the median segment broad, convex, blunt at apex. Abdomen broad, rather depressed, at base slightly concave, with a medial short longitudinal, somewhat deep depression above; sides of the 1st and 2nd segments parallel, sides of the 3rd convergent posteriorly; 2nd and 3rd abdominal segments medially longitudinally carinate; anteapical series on 3rd segment well-defined, but the foveæ round and small; apical margin armed with four equidistant acute teeth, the outer distinctly larger than the intermediate teeth.

♂ unknown.

Length, ♀ 8; *exp.* 15 mm.

Hab. Sikhim, Rungaroon, 7000 ft. (*Bingham*).

548. **Chrysis fuscipennis**, *Brullé, Hist. Nat. Ins., Hym.* iv (1846), p. 38; *Mocsáry* (Tetrachrysis), *Mon. Chrys.* 1889, p. 370; *du Buyss. Jour. Bomb. N. H. Soc.* x (1896), p. 472. (Pl. I, fig. 1.)

♀. Metallic green, shaded with varying amounts of metallic blue; the posterior portion of the median area of the mesonotum always more or less black; antennæ and tarsi dusky black, the scape in front and the basal two joints of the flagellum (in some specimens only the basal joint) bluish green; head, thorax and abdomen coarsely punctured, the punctures on the abdomen above smaller, more widely spaced, slightly foveate and delicately rugulose within; facial hollow finely and very closely rugulose; pilosity brownish, fairly abundant, long and more dense beneath, the sides of the facial hollow with long recumbent white hairs. Head a little longer than broad, not quite so broad as the pronotum; antennæ long, cylindrical; facial hollow very large, extending to the margin of the clypeus, narrowed above and bordered by a transverse carina; anterior ocellus in a fovea, with a transverse carina just above it, and a short carina on each side

joining the lower carina; top of the head narrow, convex. Thorax massive; the pronotum convex, anteriorly and posteriorly slightly and widely emarginate, the sides from above sinuate; mesonotum, scutellum, postscutellum and median segment convex, the medial area on the first rectangular, the mesopleuræ ending in a double bluntly-angular fold beneath; the produced posterior lateral angles of the median segment acute; wings more or less dark fusco-hyaline, nervures dark brown, tegulæ green or bluish green; legs slender. Abdomen: the base with three broad short grooves, the lateral grooves the wider; the 2nd and 3rd segments with a distinct, rather broad, longitudinal medial carina; the apical margin of the 3rd segment with 4 triangular teeth, and an anteapical series of 10 large foveæ.

♂. Similar; differing only in the non-exserted genitalia and in the apical teeth being shorter and broader, the medial two wider apart than in the ♀.

Length, ♀ ♂ 8–12; *exp*. 15–24 mm.

Hab. The Indo-Malayan region, extending to Syria, Palestine, Egypt and Asia Minor, and to China and Australia.

A very variable species, both in size and colour, and found at all elevations from sea-level to 10,000 ft. I found this cuckoo-wasp very common in all parts of Burma, and parasitic on three species of *Eumenes*—*E. conica*, Fabr., *E. petiolata*, Fabr., and *E. flavopicta*, Blanch. In the Journal of the Bombay Nat. Hist. Society (vol. xii, 1899, p. 585) I published the following note describing an incident connected with *Chrysis fuscipennis* which I myself observed:—

"Moulmein, April 24th.—Noticed a half-finished mud-cell of *Eumenes*, made on the woodwork of a window in my study. While examining it closely with a lens, the wasp returned with a pellet of mud, and buzzed rather angrily round my head. I moved away a little, and watched her. After flying round for a while, she alighted close to the half-finished cell, and, walking up to it, stuck the mud she was carrying on to one of its sides, and proceeded to work it into the wall of the cell, kneading it, so far as I could see without approaching too close and frightening her, with both jaws and forelegs. Then she retreated a little, as if to take a view of her work, and in a few seconds flew away, to return with more mud. It was easy to recognize the species: it was *E. conica*, the commonest of the Fossorial wasps in Burma. I watched for nearly an hour while the nest was being completed. The nest then formed the half of a hemispherical cell somewhat smaller in circumference than a rupee, with a circular opening at the top. When the cell-walls were so far finished, the wasp flew off, and was absent fully half an hour. During her absence, one of those beautiful metallic-green cuckoo-wasps, subsequently identified as *Chrysis fuscipennis*, alighted near the nest, approached it cautiously, examined it quickly, and then retreated behind the wooden framework of the window, where it remained motionless, apparently on the watch. Presently the *Eumenes* returned, carrying a green caterpillar. She alighted

on the window, and after some preliminary inspection of her nest, and hauling and dragging of the caterpillar, crammed it into the cell. She took quite a long time over it, with sometimes her head and thorax inside the cell and sometimes her abdomen. All this time the cuckoo-wasp remained perfectly still, watching. As soon, however, as the *Eumenes* had flown away, the *Chrysis* again approached the nest, slowly, and apparently with great caution. She walked all round it, then up the side, and peeped in, withdrew her head, seemed to give a final good look all round, and popped in. She could not have been more than a few seconds inside, when a loud buzz announced the return of the rightful owner of the nest. I had barely time to glance at the *Eumenes*, which alighted, as before, on the window, when my attention was attracted by the darting-out of the cell of the burglarious cuckoo-wasp. The *Eumenes* saw it, too, and with what sounded very like an angry buzz, dashed after it in pursuit, overtook it, and then the two dropped to the ground. I ran out, but I had to go round by a verandah too high to jump, to the steps, and by the time I arrived on the ground the fight was over, and the *Eumenes* had disappeared. The *Chrysis*, however, lay on the ground, crippled and crawling painfully, with all its wings torn off close to the roots. I have the specimen and one torn fore wing, which was all I could find, in my collection still. Returning to the nest, I sat and worked at a table near it for more than an hour, and inspected it at intervals through that day, but the *Eumenes* never returned, and next morning the cell was still open and unsealed. I tried to take it off with care, but it broke to pieces. Inside was one green caterpillar and two semitransparent white eggs, one much smaller than the other; of these eggs, the larger one was stuck against the wall of the cell, the other deposited on the caterpillar. I may mention that the caterpillar was quite dead."

549. **Chrysis angustata**, *Mocsáry* (Tetrachrysis), *Termész. Füzetek*, xv (1892), p. 225.

♀. Metallic green, with shades of blue on the pronotum posteriorly, on the middle area of the mesonotum, the scutellum, postscutellum and mesopleuræ, and on the 2nd and 3rd abdominal segments, the posterior portion of the last deepening to purplish blue; antennæ dusky black, the scape in front and the basal three joints of the flagellum above bluish green; legs metallic green, the tarsi dusky brown. Head, thorax and abdomen moderately coarsely punctured, the punctures somewhat shallow and rugulose within, large and cribrate on the thorax posteriorly, and smaller, more regular on the abdomen, along the medial line of the latter they are slightly farther apart; pilosity pale, somewhat less dense than in *C. burmanica*, except on the sides of the facial hollow and the legs, where it is slightly longer; recumbent on the former, rather oblique on the latter. Head, from the front, without the mandibles, somewhat circular, the vertex arched, the eyes of moderate

size, the width across clypeus between base of mandibles about the same as across the vertex between the tops of the eyes; clypeus broad, its anterior margin sinuate, facial hollow rather shallow, the transverse carina on front above its upper margin indistinct, anterior ocellus large, not enclosed by a carina. Thorax somewhat narrow, the pronotum transversely rectangular, with a medial broad short groove, the mesonotum convex, the medial area rectangular, about twice as long as broad, pro- and mesopleuræ not very rugose, the latter excavate at apex, and also obliquely grooved and margined all round; scutellum and postscutellum rounded posteriorly, convex, the latter not gibbous, posterior

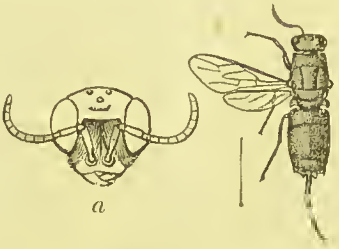

Fig. 157.—*Chrysis angustata*, ♀. *a*. Head from front.

lateral angles of the median segment moderately produced; wings fusco-hyaline, nervures brown, tegulæ purplish blue; legs somewhat slender. Abdomen somewhat long and narrow, the base of the 1st segment widely emarginate and with a slight medial impression; 2nd segment medially slightly, but distinctly carinate; 3rd segment convex in the middle, about two-thirds of the length of the 2nd segment, the anteapical row of foveæ rounded, small, apical margin with four somewhat blunt broad teeth.

Length, ♀ 9·5–10; *exp*. 18 mm.

Hab. Recorded so far from Upper Burma, Mandalay (*Fea & Bingham*); Maymyo, 3000 ft. (*Bingham*). I bred this species from cells of *Odynerus multipictus*, Smith, formed in a hole in a block of teak timber.

550. **Chrysis cotesi**, *du Buysson, Rev. d'Ent.* xii (1893), p. 249; *id. Jour. Bomb. N. H. Soc.* x (1896), p. 472.

♀. Brilliant metallic green, slightly blue on the mesonotum and above all on the apical abdominal segment; in a specimen from Deesa the mesonotum is almost entirely blue, antennæ dark brown, the scape and the basal two joints of the flagellum above green; legs green, tarsi reddish brown; head, thorax and abdomen somewhat finely and not very closely punctured, the intermediate spaces highly polished, shining and brilliant, on the top of the head the punctures run into reticulations; facial cavity rather more minutely punctured, covered with long white pubescence, which partially conceals the sculpture; pilosity brownish, very short and rather sparse. Head as broad as the pronotum in front or slightly broader; facial cavity deep and slightly constricted

posteriorly, not distinctly margined above; clypeus slightly emarginate anteriorly; antennæ thick, the 2nd joint of the flagellum longer than the 3rd, the 3rd slightly longer than the 4th; front and vertex gently convex, sloping anteriorly; occiput not sharply transverse, rounded. Thorax: the pronotum transversely rectangular, convex from side to side, the sides very slightly broadly emarginate and convergent anteriorly, the anterior lateral angles prominent; propleuræ only slightly concave, mesonotum and scutellum gently convex; the mesopleuræ convex, the apex beneath rounded and cut off by three deep foveæ; postscutellum rounded and rather prominent posteriorly; the produced posterior lateral angles of the median segment small, narrow and acute at apex; wings fusco-hyaline, nervures brown, tegulæ green; legs rather short and robust. Abdomen broad, massive, concave at base, with a medial and two lateral slight impressions, the sides parallel, towards the apex of the 3rd segment slightly convergent, 2nd segment not or very slightly medially carinate; 3rd segment with the anteapical series well-marked, the foveæ large and deep, apical margin armed with four broad, very blunt teeth.

♂. Smaller; the apical teeth remarkably blunt, their apices almost rounded.

Length, ♀ 9·5–10, ♂ 9·5; *exp.* ♀ ♂ 17–18 mm.

Hab. Probably throughout Continental India, recorded from Deesa (*Nurse*), Central Provinces and Western India (*Wroughton*), Bangalore (*Cotes*), Mysore (*Lee*).

551. **Chrysis perfecta**, *Cameron, Mem. Manch. L. Ph. Soc.* xli (1897), no. 13, p. 1, ♀.
Chrysis hoggei, *Nurse, Entomologist*, xxxvi (1903), p. 40.

♂. Metallic green shaded with blue, the head with a slight golden effulgence, the bases of 2nd and 3rd abdominal segments black, turning to dark blue towards the disc, the blue on the 3rd segment broader and more extended than on the 2nd; antennæ dusky black, the scape in front and the basal two joints of the flagellum, with the base of the 3rd joint, above greenish blue; legs greenish blue, tarsi yellowish brown; head, thorax and abdomen closely but not densely punctured, the punctures more shallow and less dense than in *C. fuscipennis*, which *C. perfecta* much resembles; on the abdomen the punctures are finer and even more shallow than on the thorax and head; facial cavity transversely rugose and thickly covered with rather long white pubescence; pilosity brownish, fairly abundant, on the abdomen it is very short and more sparse. Head from the front almost subtriangular, the sides far more convergent and the clypeus narrower than in *C. fuscipennis*; facial cavity shallow, not margined above and with no distinct transverse carinæ above it on the front; antennæ short, the 2nd joint of the flagellum the longest; anterior ocellus not placed in a margined hollow; eyes above very divergent posteriorly, the vertex very convex and broad; occiput transverse. Thorax: the pronotum transversely rectangular, above with a medial

shallow longitudinal impression, the sides broadly but slightly emarginate; propleuræ with an oval hollow much shallower than in *C. fuscipennis*; mesonotum and scutellum convex, the former shorter and the latter longer proportionately than in *C. fuscipennis*; mesopleuræ finely punctured anteriorly, coarsely rugose posteriorly, the apex below with four depressions separated by short carinæ; scutellum and median segment depressed below the level of the rest of the thorax, the posterior lateral angles of the latter produced and acute; wings as in *C. fuscipennis*, but not quite so dark. Abdomen: 1st segment somewhat concave at base, 2nd and 3rd segments medially faintly logitudinally carinate; the anteapical series of foveæ on the latter small, narrow, transverse, the apical margin with four much rounded blunt teeth equidistant from each other.

Length, ♂ 9; *exp.* 17 mm.

Hab. Recorded so far only from Bengal, Barrackpore (*Rothney*), and var. *hoggei*, Nurse ('Entomologist,' xxxvi (1903), p. 40) from Quetta (*Nurse*). The latter, of which I have seen only one specimen, also a ♂, is very similar to *C. perfecta*, Cam., with the same four very blunt teeth on the apical margin of the 3rd abdominal segment, but it is smaller, with the puncturing slightly coarser and the wings hyaline. It probably forms a subspecies or race.

C. perfecta superficially resembles *C. fuscipennis*, but can be distinguished from that species by the facial cavity not margined above, the anterior ocellus not placed in a hollow, and the remarkably blunt apical teeth on the abdomen.

552. **Chrysis bhavanæ**, sp. nov.

♀. Dark metallic green, with blue reflections in certain lights, the 2nd abdominal segment and basal area of the 3rd deep indigo-blue; the face, the legs except the tarsi, and the thorax beneath green; antennæ dusky black, the scape and basal two joints of the flagellum above green, tarsi dark brown; head and thorax closely and somewhat coarsely punctured, the punctures serried and rugose, deeper but scarcely larger on the postscutellum than on the thorax anteriorly; abdomen slightly more finely punctured, the punctures shallow but running into reticulations in certain lights; facial cavity almost as coarsely punctured as the rest of the head, but with a central, smooth, highly polished space; the head (facial cavity included), thorax and abdomen covered with a short sparse dark greyish-brown pilosity. Head thick, transverse, broader than long, occiput sloped posteriorly, slightly emarginate, vertex and front strongly convex, broad; facial cavity deep, with a deep medial longitudinal groove, its upper margin bordered by a transverse carina; antennæ short but somewhat slender, the 1st and 3rd joints of the flagellum subequal, the 2nd longer than either; clypeus anteriorly transverse. Thorax elongate, narrow; the pronotum convex, transversely rectangular, the sides parallel, a slight median impression anteriorly; propleuræ excavate, meso-

notum and scutellum gently convex; mesopleuræ slightly convex, rugose, with a broad shallow vertical depression under the base of the wings; postscutellum somewhat narrow and elongate, arched posteriorly, the produced posterior lateral angles of the median segment narrow, sharply acute at apex; wings hyaline, pubescent, nervures brown, tegulæ purple. Abdomen elongate, narrow anteriorly, transverse and bearing a medial and two lateral impressions at base above, 2nd segment with a slight medial longitudinal carina, 3rd segment with the sides strongly convergent posteriorly, the basal area transversely incrassate before the anteapical series, the foveæ small, punctiform, from 8–10 in number, apical margin narrowly and convexly arched, armed with four triangular teeth, the two medial very close together, narrow and advanced, the lateral broader at base, acute at apex, and continuous on the outer side with the sides of the segment.

♂ unknown.

Length, ♀ 7; *exp.* 13 mm.

Hab. Procured so far only in Tenasserim, Thaungyin Valley (*Bingham*).

553. **Chrysis bahadur**, *Nurse, Entomologist*, xxxvi (1903), p. 11, ♀ ♂.

♀. Head and thorax bronzy green, the latter more golden bronzy anteriorly than posteriorly, apex of scutellum and the postscutellum metallic blue, abdomen metallic green, a spot above in the middle at base of the 1st, the basal margin of the 2nd narrowly, a patch on each side on the basal portion, and the anteapical series of foveæ on the 3rd segment deep metallic blue; facial cavity golden bronze, with a touch of coppery red; antennæ dark brown, the scape in front and the basal segment of the flagellum above bronzed; head, thorax and abdomen punctured, the punctures very dense on the head and thorax, increasing in size and cribrate on the scutellum, postscutellum and 1st abdominal segment, on the 2nd and 3rd abdominal segments they are very much smaller but quite as dense and serried; facial cavity densely punctured, the punctures similar to the punctures on the head above; pilosity whitish, soft, short and rather sparse, in the facial cavity the hairs are longer, very sparse, in no way concealing the sculpture. Head a little broader than the pronotum, from the front nearly circular, clypeus slightly raised in the middle, anteriorly emarginate; antennæ rather long, the 2nd joint of the flagellum a little longer than the 3rd; facial cavity bordered above by a prominent transverse carina, the anterior ocellus prominent, not in a hollow or enclosed within carinæ, front and vertex convex, occiput slightly emarginate. Thorax: the pronotum short, broad, strongly convex from front to back, steeply declivous anteriorly, and with a small round medial depression, the sides convergent anteriorly; propleuræ excavate, mesonotum and scutellum gently convex; mesopleuræ convex, with a well-marked longitudinal groove from base to apex; postscutellum convex, rounded posteriorly; median

segment vertical, the posterior lateral angles produced, broad, convex, not very acute at apex; wings subhyaline, nervures brown, tegulæ green; legs slender. Abdomen about as long as the head and thorax united, transverse anteriorly, with a broad shallow medial impression at base above; 2nd segment very prominently medially longitudinally carinate; 3rd segment not carinate, convex, the anteapical series of foveæ well-marked, the foveæ large, round, deep and open, apical margin long, with four subequal triangular teeth.

♂. "Similar, but of a deeper blue, almost mauve colour, flagellum of antennæ black." (*Nurse.*)

Length, ♀ 7; *exp.* 13 mm.

Hab. Recorded so far only from Kashmir between 6000 to 8000 ft. (*Nurse*).

554. **Chrysis conserta**, *du Buyss. Rev. d'Ent.* x (1891), p. 37.

♀. Indigo-blue, the face in front, the pronotum anteriorly, the lateral basal portions of the scutellum and postscutellum, the sides and apical margin of the 1st and the apical margin of the 2nd abdominal segment bright green; antennæ black, the scape and the basal joint of the flagellum above green, the two succeeding joints more or less of a dull bluish tint; legs and sides of thorax greenish blue, tarsi dusky black; head, thorax and basal abdominal segment densely reticulate-punctate, the punctures largest on the scutellum and postscutellum, remaining two abdominal segments very finely and closely punctured, the punctures shallow; facial cavity finely punctured, rugulose; pilosity long, rather sparse. Head broad and thick, a little broader than the front of the pronotum; facial cavity broad but shallow, with sparse long soft hairs, sharply margined above; clypeus raised and emarginate in the middle; antennæ long, the 2nd joint of the flagellum longer than the 3rd, the 3rd and 4th subequal; front and vertex convex, occiput transverse. Thorax: the pronotum transversely rectangular, the sides slightly convergent anteriorly, the front more or less deeply medially longitudinally sulcate; propleuræ slightly concave, mesonotum and scutellum gently convex; mesopleuræ rugose, broadly obliquely longitudinally sulcate; postscutellum gently convex, subtriangular, the apex rounded; the produced posterior lateral angles of the median segment large, broad, acute at apex; wings hyaline, nervures dark brown, tegulæ deep blue. Abdomen long, the sides of the basal two segments parallel, the base of the 1st transverse above, with a medial and two lateral slight impressions; 2nd segment medially longitudinally carinate above; 3rd segment with the sides slightly convergent posteriorly, slightly transversely incrassate before the anteapical series, the foveæ in the latter (in Indian specimens) subtransverse, not deep; apical margin with four acute triangular teeth.

♂. Similar, smaller and slighter.

Length, ♀ 11, ♂ 10; *exp.* ♀ ♂ 21 mm.

Hab. Recorded so far only from Sikhim (*Harmand*); I got it at Rungaroon, 7000 ft., near Darjiling. It will probably be found throughout the Himalayas. It is a very widespread species, occurring also in North America.

555. **Chrysis saraksensis,** *Radoszk. Rev. d'Ent.* x (1891), p. 195.
Chrysis seraxensis, *du Buyss. Jour. Bomb. N. H. Soc.* x (1896), pp. 472, 473.

♀. Metallic bluish green; the median area of the mesonotum, the 2nd and 3rd abdominal segments (except at apical margins), more blue, the antennæ dusky black, the scape and the basal two segments of the flagellum above green, legs green, tarsi dark brown; head and thorax densely punctured, rugose, the punctures irregular in size and serried, abdomen more finely punctured than the head and thorax but equally densely; facial cavity punctured and granulate, the sides covered with rather long white pubescence; pilosity brownish, abundant, soft and short. Head as long as and a little broader than the pronotum; clypeus slightly raised in the middle anteriorly, transverse or a little arched; facial hollow deep, sharply margined above; antennæ long, the 2nd joint of the flagellum a little longer than the 3rd; front and vertex convex, occiput transverse, rounded posteriorly. Thorax: the pronotum subcylindrical, the sides nearly parallel, the anterior margin rounded, not sharp; propleuræ excavate; mesonotum and scutellum convex; the mesopleuræ very rugose, studded with rather large foveæ; postscutellum very convex, rounded and somewhat prominent; posterior lateral angles of the median segment produced, slightly curved downwards; wings hyaline with a slight fuscous tint, radial cell of fore wing closed. Abdomen elongate, rather narrow, at base slightly emarginate with three slight impressions above, 2nd segment medially longitudinally carinate, 3rd segment convex, the foveæ of the anteapical series few but large, apical margin with 4 rather large, triangular, subequal teeth.

Length, ♀ 6–6·5; *exp.* 11 mm.

Hab. Central Provinces (*Betham*); Western India, Bombay (*Wroughton*); Upper Burma, Mandalay, Meiktila (*Bingham*). Described originally from Saraks in Central Asia.

I have described the form found in Burma. It seems to be a variable and widely-spread species. The Central Asian specimens according to Radoszkowski are a bright green with the scutellum golden green. One Mandalay specimen has the scutellum slightly golden.

556. **Chrysis indogotea,** *Duf. et Perr. Ann. Soc. Ent. Fr.* ix (1840), p. 38; *Radosz. Hor. Soc. Ent. Ross.* iii (1866), p. 304, pl. iv, fig. 20; *Mocs.* (Tetrachrysis) *Mon. Chrys.* 1889, p. 346, ♀ ♂.

♀. Metallic green or blue according to the light, antennæ black, the scape and the basal two joints of the flagellum above blue or green, legs green, tarsi reddish brown; head densely, thorax and

1st abdominal segment more sparsely, 2nd and 3rd abdominal segments very closely punctured, the intervals between the punctures on the thorax and the 1st abdominal segment studded with minute punctures, the punctures on the head and postscutellum reticulate, on the apical two segments of the abdomen somewhat shallow; facial cavity minutely and very densely punctured with sparse silvery pubescence partially hiding the sculpture; pilosity dark brown, abundant, short. Head broader than front of pronotum, clypeus slightly raised and rounded anteriorly; facial cavity not deep, margined above by an arched carina, bent upwards at the lateral angles; antennæ rather thick, the 2nd joint of the flagellum longer than the 1st or 3rd; front and vertex convex, occiput transverse. Thorax: the pronotum transversely rectangular and convex, the sides parallel, lightly impressed in the middle above; propleuræ excavate; mesonotum and scutellum gently convex; mesopleuræ very rugose, foveate, the apex excavate; postscutellum large and prominent, convex, broadly rounded medially, subtruncate posteriorly; the posterior lateral angles of the median segment moderately produced, broad; wings hyaline, the radial cell of fore wing almost complete, shaded with brownish, nervures brown, tegulæ purplish blue. Abdomen long and narrow, the base transverse with a medial and two lateral slight impressions, sides of the basal two segments parallel, of the 3rd segment somewhat convergent posteriorly, 2nd segment medially longitudinally carinate; 3rd segment transversely incrassate in front of the anteapical series, the foveæ in this latter of moderate size, numerous and deep, apical margin convexly arched, with 4 subequal triangular teeth.

♂. Similar, scarcely smaller, a little narrower.

Length, ♀ ♂ 6–6·5; *exp.* 11–12 mm.

Hab. Recorded so far within our limits only from Sikhim, Rungaroon, 7000 ft. (*Bingham*). Extends sparingly throughout Europe, Syria, and Siberia.

557. **Chrysis ionophris**, *Mocsáry* (Tetrachrysis), *Termész. Füzetek*, xv (1892), p. 226.

♀. Metallic green; the region of the ocelli, two spots one on each side of the middle of the pronotum, the median area and a broad stripe above the tegulæ on the mesonotum, the pro- and mesopleuræ beneath, the base and middle of the 2nd broadly, and the base and apical portion of the 3rd abdominal segment purplish blue, turning to black on the median area of the mesonotum; antennæ dusky black, the scape of the antennæ in front and the basal two joints of the flagellum above bluish green. Head, thorax and abdomen closely punctured, the punctures coarser on the thorax posteriorly, fine and very shallow in the middle of the abdomen above; pilosity somewhat dense and short on the head and thorax, long beneath the former; sparse, almost entirely

wanting on the abdomen; the facial hollow and legs with a little soft fine pubescence, silvery in certain lights. Head as broad as long, eyes large, vertex convex, clypeus convex anteriorly transverse and margined in the middle; facial hollow broad, punctured with a broad, shallow, medial longitudinal groove, smooth or in certain lights indistinctly transversely rugose, the hollow above margined and above that a transverse sinuate carina, the anterior ocellus surrounded by a carina in a broad loop joining the lower transverse carina. Thorax: the pronotum transversely rectangular, convex, the mesonotum convex, medial area rectangular with the anterior angles obliquely broadened; scutellum transversely rectangular; propleuræ with a deep hollow; mesopleuræ coarsely cribrately punctate, the apex bluntly angular and excavate, margined by a carina; postscutellum somewhat narrow, prominent, convex and rounded posteriorly; median segment depressed beneath postscutellum, the posterior lateral angles acutely produced; wings lightly fusco-hyaline, nervures brown, tegulæ brown, bluish in the middle; legs slender. Abdomen narrow, the 1st segment nearly transverse at base, 2nd segment indistinctly medially longitudinally carinate, 3rd segment transversely convex, the anteapical series of foveæ large, the apical margin with 4 teeth, the two middle teeth closer to one another than either is to the lateral tooth next to it.

♂ unknown.

Length, ♀ 6–7; *exp.* 13 mm.

Hab. Recorded from Lower Burma, Palon (*Fea*); Upper Burma, Bhamo (*Bingham*).

558. **Chrysis shanghaiensis**, *Smith, Trans. Ent. Soc.* 1874, p. 460; *du Buyss. Jour. Bomb. N. H. Soc.* x (1896), p. 475, pl. 3, fig. 7.
Pentachrysis himalayensis, *Mocsáry, Horæ Soc. Ent. Ross.* xxiii (1889), p. 31, ♂.
Pentachrysis crassiscuta, *Mocsáry, Mon. Chrys.* 1889, p. 524.

♀. Head, thorax and abdomen metallic green, the space round the ocelli, the occiput, the mesonotum except a border on each side, and the bases and sides broadly of the 2nd and 3rd abdominal segments deep purple; antennæ dusky black, the scape and basal two joints of the flagellum of the antennæ green, legs green, the inner side of the tibiæ and the tarsi reddish brown; head and thorax very coarsely and closely punctured, the punctures serried and running into reticulations; abdomen a little more finely and distantly punctured, the interspaces smooth and polished; facial cavity finely punctured. Head broader than long, as broad as the front of the pronotum, occiput seen from above transverse, vertex and

Fig. 158.
Chrysis shanghaiensis, ♀.

front convex; facial cavity wide and moderately deep, margined above by a short transverse carina, the anterior ocellus with a longitudinal short carina on each side joining the transverse carina; antennæ somewhat thick, the 2nd joint of the flagellum remarkably long. Thorax: the pronotum transverse, slightly sloped to the front and bearing a short longitudinal groove anteriorly; propleuræ excavate; mesonotum and scutellum convex, mesopleuræ rugose, the apex beneath acute, excavate and margined by a carina; postscutellum with a broad triangular mucro at base; posterior lateral angles of the median segment strongly produced, broad at base, acute at apex; wings fuscous with, in certain lights, a purple iridescence, nervures and tegulæ dark aëneous brown. Abdomen massive, transverse at base, with a medial somewhat deep impression and a shallower impression on each side of it above, sides slightly convergent posteriorly; 2nd and 3rd segments medially very slightly longitudinally carinate; anteapical series of foveæ on the 3rd segment nearly obsolete, apical margin with 5 acute teeth placed on a wide arch.

♂. Similar, smaller; head and thorax more massive and shorter proportionately; abdomen broader at apex, apical teeth slightly smaller.

Length, ♀ 11–15, ♂ 9–11; *exp.* ♀ 18–26, ♂ 19 mm.

Hab. The Himalayas; Bengal; Tenasserim, Thaungyin valley (*Bingham*); Siam (*Bingham*). Described first from China.

559. **Chrysis libita**, *du Buysson, Jour. Bomb. N. H. Soc.* x (1896), pp. 475, 476, pl. 3, fig. 6.

♂. Metallic green, the space round the ocelli and the median area of the mesonotum metallic blue, the 2nd and 3rd abdominal segments bluish green, antennæ brown, the scape and the basal two joints of the flagellum above green; legs green, tarsi dark brown; head, thorax and abdomen closely but not densely punctured, the punctures of moderate size mixed with finer points, increasing a little in size on the thorax posteriorly, on the head they are closer and give a rugulose appearance, while on the abdomen they run slightly into reticulations; facial cavity finely punctured, rugulose, medially longitudinally grooved in its upper half, the groove smooth and polished within; the sides of the facial cavity covered with a soft white pubescence in part concealing the sculpture; pilosity brownish, short and fairly abundant except on the basal two abdominal segments, where it is almost entirely wanting. Head thick; clypeus medially emarginate anteriorly; facial cavity deep, margined above by a transverse carina; antennæ moderately long and thick, the 2nd joint of the flagellum a little longer than the 3rd, front and vertex convex. Thorax: the pronotum short, very declivous anteriorly, the sides a little emarginate posteriorly, strongly convergent at their anterior third; propleuræ excavate; mesonotum and scutellum gently convex; mesopleuræ

rugose, longitudinally carinate posteriorly, the apex excavate; postscutellum convex, prominent posteriorly, from above semicircular, completely overlying the median segment, except the posterior lateral angles which are broadly produced and somewhat obtuse at apex; wings hyaline, the fore wing with a faint brownish tint from base to near the apical margin, nervures brown, tegulæ green. Abdomen broad, the base transverse, a slight broad shallow depression in the middle of the base above; sides of the abdomen parallel, convergent posteriorly on the 3rd segment, the anteapical series on the latter more or less obsolete, the foveæ small and round, the apical margin broadly but not strongly curved, armed with 5 teeth, subacute, broad, the medial three subequal and shorter than the lateral teeth.

♀ unknown.

Length, ♂ 9–9·5; *exp.* 17 mm.

Hab. Recorded so far only from Poona (*Wroughton*); Tenasserim, Haungdraw valley (*Bingham*).

560. **Chrysis imperiosa**, *Smith, Trans. Ent. Soc.* 1874, p. 460; *Mocsáry* (Pentachrysis), *Mon. Chrys.* 1889, p. 526. (Pl. I, fig. 13.)

♀. Greenish blue, the facial hollow green; the region of the ocelli, the thorax above and partially on the sides, and the sides of the basal two abdominal segments, dull metallic copper-colour; the

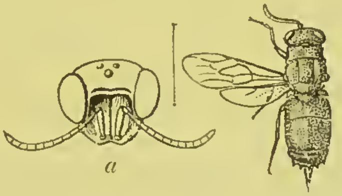

Fig. 159.—*Chrysis imperiosa*, ♀. *a.* Head from the front.

postscutellum, median segment, and the 2nd and 3rd abdominal segments shaded with brilliant purple; antennæ dull black, the scape in front and the basal two segments of the flagellum above purplish blue; the legs purplish blue, the tarsi dusky brownish black. Head and thorax coarsely and densely punctured, cribrate, abdomen more finely but just as coarsely punctured, the punctures shallow. Pilosity abundant, brownish; very short, longer on the head and towards apex of abdomen; still longer, white, recumbent or oblique in the facial hollow and on the legs. Head from the front triangular, very broad across the vertex, slightly convex; clypeus with its anterior margin sinuate, almost emarginate in the middle; facial hollow coriaceous, in certain lights appearing transversely striate; a transverse carina above its upper margin, from which is given off a semicircular carina enclosing the anterior

ocellus; antennæ somewhat massive, occiput transverse. Thorax: the pronotum transversely rectangular, a little broader at the sides than in the middle, the sides with a sinuate outline and distinctly margined; mesonotum convex, the medial area well defined, rectangular, and more than twice as long as broad; the propleuræ and the apex of the mesopleuræ excavate, the mesopleuræ triangular beneath and margined; scutellum convex and from above semicircular; postscutellum convex, prominent, narrowing posteriorly, from above almost triangular; median segment depressed beneath the postscutellum, broad, the posterior lateral angles produced, acute at apex, somewhat flat; wings fusco-hyaline, the nervures brown, the tegulæ brilliant purple; legs moderately long and robust, pruinose. Abdomen massive, broad, convex above, the base transverse, anterior lateral angles well-marked but not produced, a short deep medial impression above; 2nd and 3rd segments distinctly but not acutely medially carinate, the latter segment with a broad, deep, transverse depression along the base and an anteapical series of large and deep foveæ; between the above the segment is raised and strongly convex; apical margin with 5 triangular acute teeth.

♂. Similar, smaller, with a narrower abdomen, the apical teeth shorter and more obtuse. The metallic coppery tint less marked on thorax, the sides of abdomen orange coppery.

Length, ♀ 9–10, ♂ 8·5; *exp.* ♀ 16·5, ♂ 16 mm.

Hab. Recorded within our limits from Sikhim (*Dudgeon*), Barrakpore (*Rothney*), Ceylon (*Green*); Lower Burma, Palon (*Fea*); Pegu Yoma (*Bingham*). Described originally from Australia.

561. **Chrysis furcifera**, sp. nov.

♂. Brilliant metallic bluish green, the space round the ocelli, the occiput in the middle, the apex of the median area of the mesonotum, and the sides broadly from base to apex of the 3rd abdominal segment deep cærulean blue, the basal abdominal segment with a large spot on each side towards the apical margin fiery coppery red, the 2nd abdominal segment without any such spot or indication of one; antennæ dark brown, the scape and the basal two joints of the flagellum above green, legs green, tarsi brown; head densely rugosely punctured, the punctures increasing in size posteriorly, the thorax and abdomen much more sparsely and very coarsely cribrately punctured, on the thorax the intervals between the coarser sculpture are finely punctured here and there; on the abdomen the intervals between the punctures are smooth, shining, brilliantly polished; facial cavity deep, finely transversely rugulose, pilose; pilosity of the head and thorax slightly reddish brown, short, somewhat sparse, on the abdomen it is almost entirely wanting, on the tarsi in certain lights it has a bright golden sheen. Head about as broad as the front of the pronotum, vertex and front convex, rounded and sloping anteriorly; facial cavity broad, moderately deep, above margined by a not very distinct carina:

clypeus anteriorly transverse, slightly convex in the middle; antennæ short and thick, rather flattened and twisted and bearing a slight resemblance to the antennæ as in the genus *Pleurocera*, occiput slightly convex. Thorax: pronotum transversely rectangular, cubical, the sides parallel, the anterior lateral margins acute, prominent, the front above widely emarginate and bevelled: propleuræ excavate; mesonotum and scutellum gently convex; mesopleuræ very rugose, obtuse beneath, transverse, foveolate: postscutellum very convex, gibbous, entirely overlying the median segment, the posterior lateral angles of which are very broadly produced, flat, with the apex somewhat obtuse; wings very dark brown with a purple effulgence in certain lights, the venation normal, the radial cell of fore wing complete, nervures dark brown, tegulæ dark blue. Abdomen broad and massive, somewhat as in *C. principalis*, *C. oculata*, &c., the base slightly concave, the medial longitudinal carina on the 2nd segment absent or very indistinct; the sides of the abdomen convergent posteriorly, the 3rd segment transversely incrassate in front of the antcapical series, the foveæ small, round but distinct, the apical margin armed with 5 teeth, the outer two on each side spinoid, acute, the middle tooth broad, triangular, obtuse.

♀ unknown.

Length, ♂ 10·5; *exp.* 20 mm.

Hab. Upper Burma, Mandalay (*Bingham*).

562. **Chrysis amœnula**, *Mocsáry* (Pentachrysis), *Térmesz. Füzetek*, xxii (1899), p. 187, ♀.

"♀. Of moderate size, elongate, robustly built, with greyish-white pilosity; the vertex behind the ocelli, collar, median lobe of mesonotum, the discs of the abdominal segments, the base on each side of the 2nd and the entire base of the 3rd segment deep bluish black, the margin of the 2nd segment bright golden; facial cavity deep, densely punctured, coriaceous, the sides with silvery pubescence, above the anterior ocellus is placed in an obsoletely defined area; antennæ slightly incrassate, black, the scape and basal two joints of the flagellum green, the 2nd joint somewhat short, about equal in length to the 3rd; cheeks rather long, about equal to the 2nd joint or a little longer; vertex somewhat densely and finely, the thorax above rather strongly and closely punctate-reticulate; pronotum rather long, narrower than the head or the mesonotum, anteriorly slightly impressed in the middle, the sides parallel, not sinuate; metanotum convex, somewhat gibbous; posterior lateral angles strongly produced, triangular, acute, slightly curved; mesopleuræ below margined, the apical area distinct and coarsely sculptured; the abdomen above strongly convex, nearly evenly and somewhat densely strongly punctured, the narrow interspaces smooth; 2nd segment not medially carinate, the posterior lateral angles slightly prominent; 3rd segment rather strongly convex, the foveæ not deep, about 12 in number, for the

most part small and not distinct; apical margin short, densely punctured, 5-dentate, the teeth placed on a wide arch, not long, subtriangular, medial tooth minute, subacute, intermediate teeth longer and more acute, lateral teeth small and acute, the medial two emarginations deeper and narrower than the lateral two, the sides in front of the lateral teeth lightly sinuate; ventral side of the abdomen and the legs slightly golden green, the bases of 2nd and 3rd segments with black spots on either side; the tarsi fuscous red; wings fuscous with slight purple effulgence, nervures fuscous, the radial cell in the fore wing lanceolate, nearly complete, the apex slightly open, tegulæ bluish green.

"*Length*, ♀ 8 mm.

"*Hab.* India orientalis (*Sangli*)." (*Mocsáry*).

563. **Chrysis bengalensis**, *Mocsáry* (Pentachrysis), *Mon. Chrys.* 1889, p. 527, ♀.

♀. Brilliant metallic green, in certain lights above metallic blue; the space round the ocelli extending to the occiput, the median area of the mesonotum, the middle of the scutellum and post-scutellum, and the apical area of the 3rd segment metallic deep purplish blue; the discs of the abdominal segments are of a bluer tint than the sides, on the basal two segments the sides at apex have a bright greenish-golden spot; antennæ brown, the scape and basal two joints of the flagellum green above; the head, thorax and abdomen more or less closely punctured, the punctures on the head dense, rather small, on the postscutellum dense and large, on both running into reticulations, on the pro- and mesonotum and scutellum they are wider apart and irregular, the spaces between the larger punctures with finer points, on the abdomen the punctures are shallower, largest along the middle; facial cavity very finely densely punctured, pubescent on the sides; pilosity very fine, short and rather sparse. Head a little broader than the pronotum in front; facial cavity somewhat deep, acutely margined above by a transverse carina, from which are emitted upwards two short carinæ, arching and nearly meeting above the anterior ocellus; antennæ slender, the 2nd joint of the flagellum longer than the 3rd; front and vertex convex, broad, occiput slightly and very widely emarginate; pronotum somewhat massive, deeply impressed in the middle anteriorly, the sides margined; propleuræ broad, excavate, mesonotum and scutellum slightly convex; mesopleuræ slightly convex, the apex beneath acute, slightly excavate and margined; postscutellum from above semi-circular, convex, not concealing the median segment which is vertical posteriorly, the lateral angles broadly produced, their apices not acute; wings subfuscous, in certain lights iridescent, the radial cell of fore wing nearly complete. Abdomen rather long, the base transverse, with a somewhat deep medial and two broader and less distinctly marked impressions; 2nd segment not or very indistinctly medially longitudinally carinate; 3rd segment slightly transversely incrassate in front of the antcapical series, the foveæ

deep and distinct; apical margin with 5 teeth, the outer teeth acute, the three intermediate slightly broader. ♂ unknown.

Length, ♀ 8; *exp.* 15 mm.

Hab. Bombay, Madras (*Brit. Mus.*). I have only seen the one specimen from Madras in the British Museum, which I rather doubtfully identify as this species.

564. **Chrysis danaë**, sp. nov.

♀. Metallic green, with golden-yellow tints in certain lights, the abdomen lighter green, with burnished slight coppery tints on the disc of the 1st segment, the sides and apical margins broadly of the 1st and 2nd segments and a transverse band in front of the anteapical series of foveæ across the 3rd segment shining copper colour; the space round the ocelli and the median area of the mesonotum slightly darker green, the antennæ and apical two or three joints of the tarsi brownish, the scape in front and basal two joints of the flagellum above green; legs green, shading into coppery golden on the tibiæ and basal two joints of the tarsi; head and thorax somewhat coarsely and very closely punctured, granulate, the facial hollow finely rugulose; abdomen in striking contrast to the thorax, very minutely and densely reticulate-punctate; pilosity brownish, very short, somewhat sparse, a little silvery pubescence on the sides of the facial hollow. Head very broad above, the vertex very convex, the eyes prominent and very broadly oval, nearly circular, anteriorly the head is narrowed; clypeus anteriorly emarginate in the middle; facial hollow broad and shallow, extending right up to the inner orbits of the eyes and bounded by a continuous carina on the sides and above, no carina around or enclosing the anterior ocellus; antennæ short and somewhat slender, the 2nd joint of the flagellum much longer than the 1st but only a little longer than the 3rd; occiput widely emarginate. Thorax: the pronotum convex, long, nearly as long as the mesonotum, the sides convergent anteriorly and slightly emarginate, the posterior lateral angles produced and extending back towards the mesopleuræ; propleuræ excavate; mesonotum convex, median area very shortly rectangular and broad, only about a quarter as long again as broad; scutellum transversely rectangular, convex; mesopleuræ not very rugose nor excavate nor dentate beneath, with no carinæ; postscutellum from above semicircular, somewhat gibbous and rounded posteriorly; median segment hidden beneath the postscutellum, but the lateral angles produced, almost lanceolate, the apices acute; wings hyaline, nervures brown, tegulæ green; legs slender. Abdomen somewhat depressed, not very convex above, the basal segment with a short, broad, shallow medial longitudinal groove at base; 2nd and 3rd segments with a slight but tolerably distinct medial longitudinal carina, the anteapical series of foveæ on the latter segment small, the apical margin with 5 very short teeth, the outer somewhat acute, the three intermediate very obtuse. ♂ unknown.

Length, ♀ 6; *exp.* 11 mm.

Hab. Procured at Mandalay, Upper Burma. A very distinct species in colour, sculpture and form.

565. **Chrysis lusca**, *Fabr. Syst. Piez.* 1804, p. 171: *Mocsáry* (Pentachrysis), *Mon. Chrys.* 1889, p. 527, ♀ ♂. (Pl. I, fig. 2.)

♀. Metallic green or greenish blue, the space round the ocelli and the median area on the mesonotum purplish black, in part blue; the base and apical margin of the 3rd abdominal segment, sometimes a large spot in the middle of the disc of the same, brilliant metallic blue; a burnished coppery-red spot on each side of the 2nd segment at apex; antennæ and tarsi dusky brownish black, the scape in front and the basal two joints of the flagellum above green or blue; head, thorax and abdomen evenly and somewhat coarsely punctured, the punctures on the scutellum and postscutellum coarser than on the rest of the body, on the produced posterior lateral angles of the median segment and on the apical margin of the 3rd abdominal segment they are markedly fine and dense, mixed with one or two rather coarser punctures on the former; clypeus and facial cavity finely rugulose; pilosity fairly abundant, short and brownish above, longer beneath the head and on the legs, in the facial hollow long, silky and white. Head broader than long, eyes very large proportionately and prominent; clypeus widely emarginate in the middle anteriorly; facial hollow shallow above, not sharply margined; antennæ short, not thick, the 2nd joint of the flagellum more than twice as long as the 1st, transverse frontal carina very close to the upper margin of the facial hollow, the short emitted vertical carina irregular, a short well-marked vertical groove from the anterior ocellus; occiput transverse. Thorax: the pronotum convex, anteriorly rounded, declivous, with a broad medial longitudinal impression, the sides emarginate; propleuræ excavate; mesonotum convex, the median area twice as long as broad, rectangular; mesopleuræ excavate, the apex margined by a fine carina, this latter posteriorly continued obliquely upwards to the base of the wing; scutellum from above broad, convex, transversely rectangular; postscutellum semicircular, somewhat produced and rounded posteriorly, overhanging the median segment, the posterior lateral angles of the last produced, flat; wings fusco-hyaline, nervures brown, tegulæ blue with a little green on the margin. Abdomen: the 1st segment with the base transverse and three somewhat indistinct impressions, no distinct medial carina on 2nd and 3rd segments, anteapical series of foveæ on the latter well-marked, the apical margin with 5 almost equal teeth.

♂. Similar, a little smaller.

Length, ♀ 9–9·5, ♂ 8; *exp.* ♀ 15, ♂ 13 mm.

Hab. Throughout India, Ceylon and Burma. Extending to Java. Var. *concinna* ♀, Gribodo, from Minhla in Upper Burma, is a metallic golden green, with the face in front entirely coppery golden.

566. **Chrysis orientalis**, *Guér.* (Pyria) *Rev. Zool.* 1842, p. 146, ♂; *Mocs.* (Hexachrysis), *Mon. Chrys.* 1889, p. 592; *du Buyss. Jour. Bomb. N. H. Soc.* x (1896), p. 477, ♀ ♂.

♀. Metallic green, in certain lights brilliant dark blue, the 2nd abdominal segment more decidedly metallic blue on the sides, the 3rd segment dark blue at base, changing to purple and then to green towards the apex; the median area of the mesonotum posteriorly and the lateral grooves partly blue partly black, the blue extending posteriorly to the scutellum; antennæ and tarsi dusky black, the scape in front bluish metallic green, the basal joint of the flagellum with only a spot of bluish green at base above; head, thorax and abdomen very coarsely punctured, on the head and thorax the punctures are very close and cribrate mixed with smaller punctures, on the abdomen more distant and even; pilosity abundant, brown and short, in the facial hollow recumbent, white and rather long. Head a little longer than broad, the vertex convex; clypeus broad, its anterior margin medially transverse, not emarginate, and with a small medial convexity; facial hollow broad, shallow, coriaceous within, margined above by a transverse but sinuate carina, above which the front is set with three shallow hollows, the medial hollow margined by a carina and enclosing the anterior ocellus; occiput transverse; antennæ somewhat long, cylindrical, the 3rd joint of the flagellum longer than the basal two united, these latter subequal. Thorax: the pronotum convex, short, shorter in the middle than at the sides, the sides slightly convergent towards the front, a shallow broad longitudinal impression in the middle anteriorly; propleuræ excavate, the two deep hollows rugulose within and separated by a carina; mesonotum short, broad and convex, with the margin anteriorly depressed into a more or less smooth transverse groove lying between it and the pronotum; median area rectangular, widening slightly anteriorly; scutellum convex, from above semicircular; mesopleuræ produced, bidentate beneath, the apex separated by a longitudinal broad groove; postscutellum with a large medial mucro at base, hollow above and overhanging the median segment, the posterior lateral angles of the latter strongly produced, acute at apex, concave above, rugulose in the middle, punctured along the margins; wings fusco-hyaline with a slight purple tint, the nervures purplish brown, tegulæ purplish blue; legs rather long, slender. Abdomen massive, broad, with a short deep longitudinal groove or impression medially at base; 2nd and 3rd segments with indications of a medial longitudinal carina; the 3rd segment slightly incrassate across the middle, the anteapical series of foveæ small but distinct, the apical margin with 6 acute triangular teeth disposed on a broad curve, the outer ones the shortest.

♂. Similar; smaller, slighter, more green, the face and front golden.

Length, ♀ 11–12, ♂ 10–11; *exp.* ♀ 23, ♂ 21 mm.

Hab. Northern India: Allahabad, Lahore, Delhi (*Bingham*): Deesa (*Nurse*): Western India, Poona to Mysore (*Wroughton & Lee*); Central Provinces (*Betham*): not recorded from Burma or Tenasserim, but probably extending throughout them to the Malayan subregion and New Guinea.

567. **Chrysis indica**, *Mocsáry* (Hexachrysis), *Mon. Chrys.* 1889, p. 591, ♂.

♂. Metallic blue; the head, pronotum, mesonotum and apex of basal two abdominal segments with shades of green; the space round the ocelli, the posterior half or two-thirds of the medial area of the mesonotum and a medial longitudinal band on the scutellum black; antennæ and tarsi dusky black; the scape in front, the coxæ, trochanters, femora and tibiæ metallic green; head and thorax densely punctured, cribrate, the base of the abdomen with large scattered punctures, the spaces between minutely punctured, the remainder of the abdomen more finely punctured than the thorax, but equally closely; the facial hollow finely punctured, the punctures running into transverse striæ in certain lights; pilosity abundant, pale brown, longest on the sides of the facial hollow. Head a little longer than broad, narrowing anteriorly; clypeus raised a little and transverse in the middle; antennæ rather long, cylindrical, the basal two joints of the flagellum subequal, the 3rd joint a little longer than the 4th and more than twice the length of the 2nd, a transverse curved carina a little above the upper margin of the facial hollow, the anterior ocellus placed on the upper side of a small frontal hollow that is margined by carinæ. Thorax: the pronotum transversely rectangular, the posterior lateral angles produced back; the medial area of the mesonotum longitudinally rectangular, the anterior and posterior lateral angles of the area a little produced; mesopleuræ rugose, slightly excavate towards the apex beneath and produced into an acute triangular tooth; scutellum transverse, convex; postscutellum with a medial mucro at base pointing backwards; median segment short and truncate posteriorly, its posterior lateral angles triangularly produced. Wings fusco-hyaline, nervures brown, tegulæ blue; legs short and rather slender. Abdomen: the basal segment widely emarginate at base and with a short broad medial sulcus: 2nd segment not or only indistinctly medially carinate, its posterior lateral angles prominent; 3rd segment short, the apical margin with 6 prominent triangular teeth, the indentations between them semicircular; an anteapical row of 18 round punctures, not foveate.

Length, ♂ 9; *exp.* 17 mm.

Hab. "India orientalis," Mus. Hung. (*Mocsáry*); Upper Burma (*Fea*).

I have not seen a ♀ of this species.

568. **Chrysis arrestans**, *Nurse, Entomologist*, xxxvi (1903), p. 42, ♀.

"♀. Head and thorax coarsely. abdomen finely punctured; head and thorax very slightly narrower than abdomen; clypeus emarginate anteriorly; a well-defined sinuate transverse ridge below anterior ocellus, and the front below it concave, with sparse white pubescence, under which it is finely punctured; head viewed from above nearly twice the size of the pronotum, the latter with a median longitudinal depression; 1st abdominal segment almost impunctate in the centre, 2nd segment with a median longitudinal carina, 3rd segment sexdentate, the teeth sharp and with a subapical row of foveæ. Dark blue-green, with a purple tint in some lights; the clypeus. mandibles at base and scape of the antennæ bright metallic green; mandibles black in the centre, red at apex; 2nd abdominal segment green at apex; antennæ and tarsi dark red, almost black; wings hyaline. tegulæ purple. radial cell not quite closed.

"*Length*, ♀ 6 mm.

"*Hab.* Deesa; a single specimen." (*Nurse.*)

569. **Chrysis durga**, sp. nov.

♀. Dark green, the middle of the scutellum, the disc broadly of the 2nd abdominal segment and the apical area of the 3rd segment dark blue, the space round the ocelli and the anterior portion of the median area on the mesonotum black, facial cavity and clypeus bright golden or bronzy green; antennæ brown, the scape in front and basal joint of flagellum above green. In some specimens the base of the 3rd abdominal segment is dark blue, in others the black on the vertex and on the median area of the mesonotum is entirely wanting. Head and thorax densely punctured, the punctures serried and close together (except on the scutellum and postscutellum, where they are wider apart), and themselves with finer punctures within; abdomen with large scattered punctures which, like those on the thorax, are finely punctured within, the intervening spaces very densely and minutely punctured, the whole abdomen having thereby a densely rugulose, finely reticulated appearance; facial cavity finely punctate-reticulate, the upper third or fourth with large and coarse punctures; pilosity short, very sparse, brownish in colour, the facial cavity with a little very fine silvery pubescence. Head thick, as broad as the pronotum anteriorly; occiput slightly emarginate, vertex and front convex. sloping to the front; facial hollow shallow above, margined by a transverse carina; antennæ slender, somewhat elongate, 2nd joint of the flagellum longer than the 3rd. Thorax: the pronotum short, transverse, subcylindrical, the propleuræ excavate; mesonotum and scutellum gently convex; mesopleuræ rugose, longitudinally grooved, the apex beneath subacute; postscutellum convex. rounded; posterior lateral angles of the median segment broad at base, acute at apex but short; wings hyaline, nervures brown,

tegulæ purple. Abdomen elongate, subcylindrical, the base transverse, with a shallow short medial impression above; sides very slightly arehed outwards, the sides of the 3rd segment slightly eonvergent posteriorly, the apical margin arched, with 6 teeth, the medial four triangular, acute at apex, more or less equidistant, the outer two, one on eaeh side, very broad, very obtuse and shorter than the others; the anteapical series well-marked, the foveæ 14–16 in number, large and open, deereasing in size laterally, the segment slightly transversely inerassate in front of the anteapical series.

♂ unknown.

Length, ♀ 7–8; *exp.* 14 mm.

Hab. Burma: Pegu Yoma, Mandalay. Maymyo, 3000 feet (*Bingham*).

A very distiuet species, easily recoguizable by its rugulose, very irregularly and densely punctured abdomen. I bred one specimen from the nest of *Sceliphron intrudens*, Smith.

570. **Chrysis oculata**, *Fabr. Syst. Ent.* 1775, p. 357; *Smith* (Pyria), *Trans. Ent. Soc.* 1874, p. 465; *Mocs.* (Hexachrysis) *Mon. Chrys.* 1889, p. 543. (Pl. I, fig. 15.)

♀. Deep metallie blue to bluish greeu, the 2nd abdominal segment with a large spot fiery copper-red on eaeh side near apical margin. The deep metallie-blue varieties have the space round the oeelli, three spots placed in a row transversely on the pronotum, the mesonotum in the middle posteriorly and the middle of the seutellum blaek, portions of the thorax and the basal two segments of the abdomen above with shades of metallic green; autennæ and tarsi black, the seape in front and the basal segment only of the flagellum above green; head and thorax densely and eoarsely cribrately, abdomen more finely and more sparsely punetured, a few large seattered punetures at base of 1st segment; pilosity brownish, fairly abundant on the head and thorax, sparse on the abdomen; faeial eavity and legs with rather sparse long white hairs. Head longer than broad, elypeus subporrect, anteriorly arehed, faeial hollow somewhat finely and densely rugose, its upper margin bordered by a sharp transverse earina; anterior oeellus plaeed in a square depression bordered above and laterally by short carinæ, and below by the above transverse earina; antennæ rather long, cylindrieal, the basal two joints of flagellum subequal and united about two-thirds the length of the 3rd joint; vertex convex; occiput widely emargiuate, showing the neek or collar between it and the anterior margin of the pronotum, this eollar green, finely punetured, with a medial large. deep, polished unpunctured depression. Thorax: the pronotum convex, short. longer at the sides than in the middle, its anterior margin sloped to the frout; propleuræ exeavate; mesouotum and seutellum convex, the latter transversely reetangular; median area on the mesonotum more or less reetangular, broadening a little anteriorly.

anterior margin of the mesonotum distinctly depressed, forming a sort of shallow, finely punctured groove between it and the pronotum; mesopleuræ coarsely sculptured, an oblique broad groove from underneath base of wings to near the apex of the mesopleuræ, the latter beneath bidentate; postscutellum gibbous, coming to a blunt point, which is longitudinally sulcate in the middle posteriorly; median segment depressed beneath the postscutellum, the posterior lateral angles produced but not large. Abdomen massive, the 1st segment concave anteriorly, impressed in the middle at base above, the anterior lateral angles rather prominent; 2nd segment with a slight medial longitudinal line scarcely carinate; 3rd segment with a transverse, slightly incrassate portion in front of the anteapical series of foveæ, which latter are large, deep and round; apical margin with 6 triangular acute teeth, the medial four longer, narrower, closer to one another than to the outer tooth on each side.

♂. Differs from the ♀ in being more green and having the 3rd abdominal segment shorter, more widely and roundly truncate.

Length, ♀ 11–13, ♂ 11; *exp.* ♀ ♂ 22 mm.

Hab. Probably the whole of Continental India. I procured one specimen at Kandy in Ceylon, and I found this species common in both Upper and Lower Burma; it is recorded by Gribodo from Upper Burma.

Var. *sumptuosa*, Gribodo, from Burma, differs in being brilliant cupreous or golden, with cupreous spots on the sides of the 3rd as well as on the 2nd abdominal segment.

571. **Chrysis schioedtei**, *Dahlb. Hym. Eur.* ii (1854), p. 309, ♀; *Mocsáry* (Hexachrysis), *Mon. Chrys.* 1889, p. 544.
Chrysis gemmatus, *Smith, Trans. Ent. Soc.* 1874, p. 461, ♀.
? Chrysis siva, *Mocsáry* (Hexachrysis), *Mon. Chrys.* 1889, p. 545, ♀.

♀. Metallic green or bluish green, the 3rd segment for the most part metallic blue, the space round the ocelli and three spots in a transverse row on the disc of the pronotum dull black, the rest of the thorax shaded above more or less with black varying in different specimens, the apical margin of the 2nd segment with a lateral spot of fiery copper colour which varies in size and intensity, sometimes very nearly indistinguishable; head and thorax coarsely closely punctured, cribrate, the large punctures with minute puncturings within; abdomen much more finely and evenly punctured, the punctures shallow, very fine and dense on the basal abdominal segment, which also bears a few large scattered punctures near the base; pilosity brown, very short, moderately abundant, on the sides of the facial hollow and on the legs it is white, more or less oblique and longer. Head short and broad, about as broad as the pronotum in front; clypeus broad, its anterior margin broadly and slightly emarginate; facial hollow broad and deep, bordered above by a somewhat prominent transverse carina, from which another short rather indistinct carina is emitted, forming a loop enclosing the anterior ocellus; vertex with a rounded slope to the front, occiput transverse; antennæ cylindrical, rather long, the

2nd and 3rd joints of the flagellum subequal. Thorax: the pronotum convex, transverse, a little broader at the sides than in the middle, the anterior margin with an indistinct and slight longitudinal impression in the middle; propleuræ excavate; mesonotum convex, the median area rectangular, with the anterior lateral angles widened and turning obliquely outwards, the anterior margin depressed, forming a somewhat broad shallow transverse groove which is minutely and closely punctured; mesopleuræ rugose, the triangular apex beneath surrounded by a carina and separated from the upper portion of the mesopleuræ by a deep, short, laterally carinate groove; scutellum from above with the middle slightly narrowed, transversely rectangular; postscutellum semicircular, rounded posteriorly, hiding the median segment with the exception of its posterior lateral angles, which are produced, flat, and acute at apex; wings brownish hyaline, nervures brown, tegulæ purple; legs slender. Abdomen: the 1st segment somewhat hollow and concave at base, with a medial longitudinal broad impression at base above; 2nd and 3rd segments medially longitudinally carinate, the 3rd segment bulging and incrassate just before the anteapical series of foveæ, these latter large, open beneath; apical margin of segment with 6 acute teeth, the two outer smaller than the 4 intermediate ones.

♂. Similar; smaller, more green and with the black markings more distinct.

Length, ♀ 9·5–10, ♂ 8·5; *exp.* ♀ 19–20, ♂ 18 mm.

Hab. The Punjab (*Bingham*); Central Provinces (*Betham*); Western India, Poona (*Wroughton*), Deesa (*Nurse*); throughout Burma and Tenasserim (*Fea*, *Bingham*). Extending to Australia.

572. **Chrysis principalis**, *Smith, Trans. Ent. Soc.* 1874, p. 461, ♀; *Mocs.* (Hexachrysis) *Mon. Chrys.* 1889, p. 559. (Pl. I, fig. 12.)

♀. Metallic green, the space round the ocelli, three spots on the pronotum, and the lateral grooves limiting the medial area on the mesonotum brownish black; the front above the facial cavity, the mesonotum anteriorly, the pro- and mesopleuræ, median segments and legs, the bases and greater part of the discs of the segments of the abdomen and the anteapical foveæ on the 3rd segment shaded with brilliant blue; antennæ and tarsi dusky black, the scape of the former in front and the basal two, sometimes three, joints of the flagellum above metallic green; head, thorax and base of abdomen coarsely cribrately punctured; the interspaces on the mesonotum rugulose, on the base of the abdomen finely punctured, the large punctures smooth and shining within; the apical half of the 1st and the remaining abdominal segments finely and densely punctured in contrast to the coarse punctures on the thorax; pilosity sparse, brownish on the head, thorax and abdomen, whitish on the legs. Head a little longer than broad, slightly constricted anteriorly; clypeus broad, somewhat golden green; facial hollow rugose within, deep and broad, further deepened above into two pits, the margin above each pit arched; the front

above the facial hollow with a transverse carina, the little carinæ branching upwards from the latter irregular; head posteriorly transverse; antennæ short, somewhat thick; the 2nd joint of the flagellum long, more than twice the length of the 1st joint. Thorax massive; the pronotum very convex, transversely rectangular, the sides widely emarginate anteriorly, a slight depression in the middle; propleuræ with two large depressions; mesonotum, scutellum and postscutellum forming a regular and somewhat gentle convexity; the median segment depressed and with a broad V-shaped hollow posteriorly formed of 4 large depressions, the posterior lateral angles broadly produced, subacute; mesopleuræ coarsely irregularly cribrate, blunt beneath, the apex margined by a carina, which is continued posteriorly up to the bases of the wings; the latter brownish hyaline, the nervures brown, the tegulæ with the basal half blue, the outer half green; legs short and robust. Abdomen: the basal segment subemarginate in the middle at base, the 2nd and 3rd segments medially broadly subcarinate; the anteapical series of foveæ on the 3rd segment large and well-marked; the apical margin with 6 large triangular teeth, the medial 4 subacute and long, the outer one on each side shorter, broader, more obtuse.

♂. Similar, smaller and slighter.

Length, ♀ 12–13, *exp*. 22; *length*, ♂ 10, *exp*. 21 mm.

Hab. Recorded from the Himalayas; Bengal (*Mocsáry*); Poona (*Wroughton*); Ceylon (*Mocsary*); Burma and Tenasserim (*Bingham*). Extending to China and the Malayan subregion.

573. **Chrysis comottii**, *Grib. Ann. Mus. Civ. Gen.* (1884), p. 367.
Chrysis insularis, *Smith* (*nec Guér.*), *Jour. Linn. Soc.* iii (1859), p. 26.

♀. Exceedingly like *C. principalis*, Smith, of which it may be merely a local race. Differs in having the pronotum, the anterior half of the mesonotum and the abdomen much more sparingly punctured than in *C. principalis*; the intervals between the large punctures on the mesonotum and pronotum are, in the type specimen in the British Museum, minutely punctured, and the puncturing on the abdomen is much more regular and neater than in *C. principalis*. Beyond this I can see no difference.

Length, ♀ 11–12; *exp*. 22 mm.

Hab. Pondicherry (*Gribodo*); Upper Burma, Meiktila (*Comotto*). Extending to the Malayan subregion.

574. **Chrysis feana**, *Mosc.* (Hexachrysis), *Termész. Füzetek*, xv. (1892), p. 235.

♀. Metallic dark green; the occiput, the median segment posteriorly and the middle from the base to near the apex of the 2nd abdominal segment dark metallic blue, the 3rd segment entirely dark blue except for a transverse narrow band of green in front of the anteapical series of foveæ; the space round the ocelli, three spots in a transverse row on the disc of the pronotum, and some

markings in the middle of the mesonotum and scutellum black or very dark purple; antennæ and tarsi dull black, the scape in front and the basal two segments of the flagellum above dark blue; head and thorax coarsely and very closely punctured, cribrate; abdomen very finely, somewhat densely punctured, the 1st segment with scattered large punctures at base; the punctures on the head and thorax with minute punctures within, those on the abdomen, especially on the apical two segments, shallow; pilosity short, brownish, only moderately abundant, sparse on the 2nd abdominal segment, no whitish pubescence in the facial hollow in the three specimens I have seen. Head as broad as the pronotum; clypeus broad, its anterior margin transverse; facial hollow shallow, margined above, coriaceous within, slightly above it on the front is a sinuate transverse carina, no distinct carinæ emitted from it towards the vertex; antennæ long, cylindrical, pubescent; the 2nd joint of the flagellum twice the length of the 1st; vertex and front convexly sloping anteriorly; occiput transverse. Thorax: the pronotum convex, transversely rectangular, the sides with a sinuate margin; propleuræ excavate; mesonotum and scutellum convex, the latter slightly but suddenly narrowed from near the base to the apex, its posterior margin transverse; median area of mesonotum rectangular, its anterior lateral angles not outwardly curved or broadened; mesopleuræ coarsely rugose, the triangular apex excavate and margined by a carina: postscutellum semicircular, not produced or overhanging the median segment; the latter vertical, with a series of large depressions arranged in V-shape on its posterior face, the lateral angles produced, acute, somewhat thick; wings hyaline, with a slight fuscous tint anteriorly; nervures brown, tegulæ purple; legs somewhat robust. Abdomen: the 1st segment anteriorly very slightly concave, a short, broad, medial longitudinal impression at base above; 2nd and 3rd segments medially carinate, the latter comparatively long, with the middle portion raised in a transverse line in front of the anteapical series of foveæ, these very large, well-marked and open; the apical margin with 6 teeth, of which the 4 medial are long, narrow and acute, closer to one another than to the outer, somewhat short and obtuse teeth on each side of them.

♂. Two specimens from the Haungdraw valley, Tenasserim, which I identify as the males of this species, are identical in structure and sculpture with the ♀, but are entirely green in colour, with black markings similar to those on the ♀.

Length, ♀ 9–10, ♂ 9; *exp.* ♀ ♂ 18 mm.

Hab. Burma: Bhamo district (*Fea*); Tenasserim, Haungdraw valley (*Bingham*).

575. **Chrysis obscura**, *Smith, Jour. Linn. Soc.* v (1861), p. 67: *Mosc.* (Hexachrysis) *Mon. Chrys.* 1889, p. 561.

♀. Somewhat resembles *C. orientalis*, Guér., but is decidedly less massive and robust, with lighter sculpture on the head and thorax

and no mucro on the postscutellum. Head and thorax metallic green, basal two segments of the abdomen metallic blue with greenish reflections in certain lights. 3rd abdominal segment dark purple; the space round the ocelli, three coalescent spots along the posterior margin of the pronotum, and the middle posteriorly of the mesonotum and scutellum deep purplish black; antennæ and tarsi dark brown, the scape in front metallic green, no green or blue on the basal joints of the flagellum; head and thorax very coarsely densely punctured, cribrate; abdomen finely and closely punctured, with more scattered larger punctures at base of the 1st segment, most of the large punctures on the head and thorax with minute punctures within; pilosity as in *C. orientalis*. Head proportionately rather small, vertex convex, not sloped to the front; clypeus broad, anteriorly slightly emarginate in the middle;

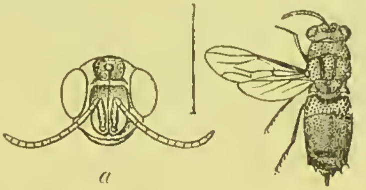

Fig. 160.—*Chrysis obscura*, ♀. *a*. Head from front.

facial hollow broad, punctured and coriaceous within, margined above by a strong carina from which two or three not well-defined carinæ are emitted upwards towards the anterior ocellus; antennæ thick, cylindrical and long; the 2nd joint of the flagellum very short, only about half the length of the 1st, the 3rd joint very long, more than twice as long as the first two united; occiput not transverse, slightly arched posteriorly. Thorax: the pronotum very convex, transversely rectangular; the anterior angles slightly prominent, the sides nearly straight; propleuræ posteriorly excavate; mesonotum and scutellum convex, the latter semicircular, narrowed posteriorly from near the base, the median area on the former rectangular, not broadened anteriorly; mesopleuræ very coarsely sculptured and excavate, bidentate beneath; postscutellum short, slightly constricted towards the apex, and together with the median segment very coarsely sculptured; the posterior lateral angles of the latter produced, broadly triangular, concave above and acute at apex; wings dark fusco-hyaline, with purple iridescence in certain lights, nervures purplish brown, tegulæ purple at base, green outwardly; legs robust. Abdomen: the 1st segment concave at base, a shallow, short, medial longitudinal groove at base above; no medial carina on the 2nd and 3rd segments, the latter very slightly incrassate in front of the anteapical series of foveæ, these are very large, open and deep; apical margin with 6 triangular almost equidistant teeth arranged on a broad curve, the outer two only very slightly shorter than the others.

♂. Very similar in sculpture and form, but more green than blue and slightly smaller.

Length, ♀ 11–12, ♂ 10·5; *exp.* ♀ 19, ♂ 18 mm.

Hab. Burma, Bhamo district (*Fea*), Meiktila (*Bingham*), Tenasserim, Tavoy (*Ingram*). Originally described from the Celebes.

Genus EUCHRŒUS.

Chrysis, pt., *Fabr. Mant. Ins.* i (1787), p. 283, ☿; *Mocsáry, Mon. Chrys.* 1889, p. 595.

Euchrœus, *Latr. Gen. Crust. & Ins.* iv (1809), p. 49.

Type, *E. purpuratus*, Fabr., from Europe.

Range. Both hemispheres.

♀ ♂. Allied to and closely resembling the genus *Chrysis*; differs chiefly in the form and armature of the 3rd abdominal segment. Head subtriangular, the cheeks below the eyes and the clypeus, the maxillæ and the labium rather long, longer than in true *Chrysis*; facial hollow short, not reaching quite up to the base of the antennæ. Thorax and abdomen with the sides parallel; wings proportionately longer than in *Chrysis*, the neuration of the fore wing similar, the radial cell always open, but never so much as in *Holopyga*, and always for less than one-third of its probable length; 3rd abdominal segment with a rounded transverse subapical ridge in front of the anteapical series, *the apical margin serrate, beset with numerous small and large uneven teeth.* In the one species recorded so far from within our limits, the transverse anteapical ridge is not so prominent as in the typical species.

576. **Euchrœus cupreiventris**, *Cam. Jour. Bomb. N. H. Soc.* xiv (1902), p. 423, ♀.

♀. Metallic green with golden and blue tints on the vertex and abdomen, scape of the antennæ green, the flagellum black, the legs bluish green, the anterior and posterior femora at apex, the anterior and intermediate tibiæ in front, the posterior tibiæ entirely, and the whole of the tarsi rufo-testaceous; head strongly punctured, pilose, the pilosity white, thick in the facial hollow, sparse and short elsewhere; the punctation in the facial hollow is shallow, on the apex of the clypeus large and deep, forming irregular foveæ; anterior ocellus surrounded at back and sides by a smooth groove extending below it on to the front. Thorax more or less closely coarsely punctured, the punctures coarser on the scutellum and postscutellum than in front, the sides of the pronotum prominent anteriorly, the base impressed anteriorly in the middle; mesonotum anteriorly depressed, closely, rather finely punctured; mesopleuræ grooved, rounded at the apex beneath; postscutellum gibbous, posteriorly superimposed on the median segment, the posterior face of the latter with a medially carinate area in the centre, the posterior lateral angles produced; wings fusco-violaceous, nervures black, tegulæ large and punctured. Abdomen: the apex of the 1st, the base and apex of the 2nd and the base of the 3rd segment closely and minutely punctured, the rest of the abdomen with larger, more distant punctures, the apical

depressions covered with white pubescence; the apical margin of the abdomen with stout, mostly bluntly pointed short spines intermixed with smaller sharper ones; the anteapical foveæ few in number, and the broad apical margin thickly punctured. (*After Cameron.*)

Length, ♀ 10 mm.

Hab. Recorded so far only from Deesa (*Nurse*).

Subfamily PARNOPINÆ.

This subfamily is distinguished from the *Chrysidinæ*, which it much resembles, by the remarkably elongate maxillæ and ligula which, as a rule, are in repose folded back beneath the thorax; the labial and maxillary palpi are one- or two-jointed; and the stigmata of the median segment are placed above the produced posterior lateral angles, and not beneath as in the *Chrysidinæ*.

The subfamily contains only one genus, *Parnopes*.

Genus **PARNOPES**.

Parnopes, *Latr. Préc. Car. Gén. Ins.* 1796, p. 126.

Type. *P. carnea*, Fabr., Europe.

Range. Both hemispheres.

♀. Head subtriangular; the frontal cavity shallow; mandibles narrow, bidentate at apex; clypeus broad, convex; antennæ moderately long, somewhat thick; eyes large; vertex and occiput broad; the ocelli well-formed and distinct, but not very prominent. Thorax somewhat massive, slightly convex above; mesopleuræ produced beneath, slightly convex and not grooved; scutellum broad, somewhat flat, trapezoidal; postscutellum with a tabular, somewhat triangular lamina above, the apex of which points backwards and overhangs the median segment; median segment truncate posteriorly, the posterior lateral angles strongly produced. Wings of moderate size; fore wing with a complete medial and 1st submedial cell, an incomplete 2nd submedial and radial cell, and a discoidal cell of which the upper and outer nervure is only indicated; cubital cells entirely absent. Legs slender, of moderate length, trochanters one-jointed, claws simple. Abdomen with 3 visible segments, broad, convex above, concave below, the anterior lateral angles of the basal segment prominent, the posterior margin of the 3rd segment entire or at most denticulate, above medially shortly carinate, with a slight depression on either side of the carina.

♂. Similar; abdomen with 4 visible segments.

577. **Parnopes viridis**, *Brullé, Hist. Nat. Ins. Hym.* iv (1846), p. 13, ♂; *Buyss. Jour. Bomb. N. H. Soc.* x (1896), p. 478, pl. iii, fig. 13, pl. iv, figs. 5–11, & pl. v, fig. 9.

♀. Metallic green, with shades of blue on the tegulæ, the scutellum, postscutellum and the abdomen posteriorly; densely

and coarsely punctured, the scutellum and postscutellum above, the sides of the thorax and the median segment very rugose, the middle of the mesonotum anteriorly, the 1st abdominal segment at base, and the middle of the 2nd abdominal segment more distantly punctured, with smooth shining intervals between the punctures; on the basal and apical margins of the 2nd and on the base of the 3rd segment the punctures are very much finer and closer together. Head from the front with the mandibles subtriangular; the frontal hollow shallow, not margined, densely pubescent, the pubescence whitish; mandibles narrow, bidentate; clypeus short, convex; antennæ black, short and thick, the scape green above, the vertex broad and slightly flat; the ocelli a little depressed, level with the surface of the head. Thorax: the pronotum transversely rectangular, with a slight medial longitudinal

Fig. 161.—*Parnopes viridis*, ♀. *a*. Head from front, showing elongate mouth-parts; *b*. Thorax; *c*. Third abdominal segment.

depression on the anterior margin; mesonotum slightly convex, the medial area broad and ill-defined, the mesopleuræ triangularly produced beneath, the apex rounded; scutellum trapezoidal, postscutellum above with a triangularly produced lamina at base, directed posteriorly and overhanging the median segment, this latter vertically truncate posteriorly, the posterior lateral angles produced, divergent, more or less flat above, acute at apex; wings fusco-hyaline, nervures brownish; legs punctured, the coxæ, trochanters, femora and outer side of the tibiæ of the anterior, and the coxæ, trochanters, femora and tibiæ of the intermediate and posterior legs green; the front of the anterior tibiæ, the apex of all the femora, the base and apex of all the tibiæ, and all the tarsi reddish. Abdomen broad and massive, the anterior lateral angles of the 1st segment prominent; the 3rd segment with a strong medial longitudinal short carina towards the apex, and a pinching in or preapical depression on each side of it, the apical margin of the segment crenulate or denticulate.

♂. Similar, but with 4 abdominal segments.

Length, ♀ 13, *exp*. 22; ♂ 12, *exp*. 23 mm.

Hab. Pondicherry; Calcutta (*du Buysson*); Sikhim (*Bingham*): Northern Gujerat, Deesa (*Nurse*).

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